AMERICAN GAS ASSOCIATION MONTHLY

Vol. VI No. 3

MARCH, 1924

THE great outstanding fact in the economic life of America is that the wealth of the Nation is owned by the people of the Nation. The stockholders of the great corporations run into the hundreds of thousands, the small tradesmen, the thrifty householders, the tillers of the soil, the depositors in savings banks, and the new owners of government bonds, make a number that includes nearly our entire people.

—*Calvin Coolidge*

C O N T E N T S

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AUTHORS

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American Gas Association Monthly

Vol. VI MARCH, 1924 No. 3

Cooperation

In our last issue we wrote about "Our 400," the four hundred busy gas men on our committees who are giving freely of their time to serve the Association and the gas industry.

The work that they are doing is valuable work—work that when successfully carried to its conclusion will be of tangible profit to our members and to the industry.

Therefore, say we, they deserve all the praise and thanks that such unselfish effort merits.

But they deserve something more—something a bit more practical in the way of support—cooperation.

Oftentimes it is necessary for them, in the study and development of the various questions before them, to seek information from our membership. This may be data on some question—it may be figures on some process or some ramification of our business—it may be merely an opinion on some matter. But whatever it is, you may be sure that it is information necessary for the intelligent carrying on of the committee's work.

Their request may come as a questionnaire, or a letter, or simply a notice published in the Monthly.

However it may come, it should be answered fully and promptly by our membership.

Surely this cooperation, which can take but an infinitesimal amount of time on each member's part as compared to the time these committee men are giving, is the very least that could be expected.

In fact, the more fully these requests are answered, the heartier the cooperation given, the more valuable will be the results—the greater will be the benefit to our members.

AMERICAN GAS ASSOCIATION MONTHLY

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Two Important Problems of the Public Utilities

MARTIN J. INSULL, Vice-President, Middle West Utilities Company

THE GENERAL PUBLIC'S conception of utility regulation was, and largely is, confined to the downward regulation of rates. Some regulating commissions were unfortunate enough to come into office at a time when economic conditions were going through such a tremendous upheaval that rate regulation necessarily had to be upwards instead of downwards.

Rates for utility service are primarily regulated by economic conditions. Prices of commodities, labor and money must finally determine rates for utility service; they should not be settled upon an arbitrary basis to agree with a popular conception. But regulation of rates of utilities, by itself, is merely a detail in the greater problems of the regulation of utilities. Its real importance is only in connection with those greater problems.

Rates Must Insure Growth

Operators and regulators agree that, as far as possible, the public should be given the best service that can be given them at the most reasonable rate. Operators, however, feel that the public's interest in the utility business is such that the rate agreed upon must be one that will insure the continuance of the best service and, in addition, so establish the credit of the utility that it can secure the necessary money for further development of that service to meet constantly increasing demands. The operators do not agree with statements, sometimes made, that they must provide the best of service at lower rates without consideration for other factors on which rates have a decided bearing and which, in the public's interest, are really of greater importance than the rate itself.

The public have a far greater interest in the utilities than that of whether they pay a little more or less per kilowatt hour for electric energy, per cubic foot of gas, per gallon of water, per street car ride, per telephone call, or per hundred pounds of freight carried by the railroads. Their greatest interest is that the utilities may continue to develop and expand so that they can meet all demands for service. This is absolutely necessary for the success of the public in their business and for their comfort in their home and social life. The public's greatest interest is best served when they are able to get all the kilowatt hours of electric energy, cubic feet of gas, gallons of water, street car

rides, telephone calls, and freight movements that they require.

Public utility operators, by and large, believe in the regulation of utilities. To be successful, however, regulation must be on the broadest plane, with the necessary knowledge and vision to see what is required, not for the immediate, but for the ultimate advantage of the public.

The problem of bringing about an enlightened and sympathetic public opinion towards the utilities is one of the great problems of the utility business. The other is the problem of financing the requirements of the utilities to meet the demands for services that the public themselves are making and will make upon them. To the solution of these two important problems the cooperation of the regulatory bodies and the operators of the utilities is absolutely necessary.

So far as the public point of view is concerned, we have got to bear in mind that the utility business is one which fundamentally differs, in its economics, from those businesses in which the public as a whole is engaged. The utility business is a business that requires a very large amount of capital invested per dollar of business done, whereas the business of the public as a whole is a business which is large for the amount of capital invested. The ordinary business man can hardly imagine a business that requires $5 of capital per $1 of income, when his mind is all the time running on a business that produces $5 or more of income per $1 of capital employed. He has hardly any conception of a business that has to provide the necessary equipment to take care of the maximum demands that are made upon it at the moment they are made, and which cannot be equalized over a considerable period.

Responsibility of Regulators

Along the lines of these fundamental problems of the utility business the public must be educated before there can be a sympathetic public feeling toward the utilities. This education has already started, and the effect can already be seen. It must go a great deal farther, however, if the public are to receive all the benefits that they can receive from the utilities of the country. Towards this end, regulating bodies and operators should co-operate in every way they possibly can. Regulating officials should not encourage the public to expect better service at lower rates, without in any way pointing out the greater problems of the business in which their greater interest lies. They should not tell the public that through regulation the utility business is a business in which the profits are practically guaranteed.

Under regulation, there seems to me to be no profit in the utility business, as profit is generally known. The utility is allowed to earn a fair and reasonable return upon the amount invested in its property, which is nothing more than the wages of capital, and surely capital is entitled to a fair wage before you can consider talking about profits. The ordinary business man's conception of profits is something over and above a fair return upon the capital he has invested in his business.

Rate regulation by prejudice and not by reason invariably hurts the public. An ill-advised reduction of rates results in lowering the credit of the utility and makes it practically impossible for it to secure the money to provide for further service necessary to meet the demand that the business man must make upon it in order for him to enlarge and improve his own business.

The great problem of a business in which the money must necessarily be permanently invested and in which the amount of money required for the busi-

ness done is so large, is that of continuously securing the money that is constantly required and must be obtained if the development of the country is to go forward.

In order that the credit standing of the electric light and power industry may entitle it to the necessary money to continuously develop its service to meet public demands, it must be able to show a good statement of earnings. It is in this problem of financing the industry that the rate for service assumes its real importance. The rate must be such as to provide operating expenses, taxes and depreciation, and enough net earnings to attract the investor.

It is here that the public's real interest in the rate appears. Their question should be, "Is the rate high enough to provide the net earnings that will attract the necessary capital so that the industry can provide all the facilities necessary for the service demands we may make upon it?"

Functions of "Holding Companies"

Assuming the necessary credit standing, the money can be obtained from the investor who becomes a creditor by loaning his money on bonds and from the investor who becomes a partner by permanently investing his money in stock, either preferred or common. The money supplied by the loaner is as a rule secured through the investment banker who requires for the protection of his client a 40 to 50 per cent equity in the property to be represented by stock. The partner represented by the preferred stock—which may be taken by an investment banker and distributed or better yet may be sold to the utilities customer—owing to his having no particular knowledge of the business, is entitled to a 20 to 25 per cent equity represented by the common stock to be subscribed for by the interests responsible for the operation of the property. In these days of massed production in modern, large, economical generating stations serving large areas over high-tension transmission systems, the amount of capital represented by the junior equity is necessarily in most cases quite large and must, to keep the balance between the different classes of securities, become larger as the business develops.

To provide these large amounts it has been necessary to form what are termed "holding companies," the function of which is far better expressed by the term "investment companies." They raise money on their own securities to invest in the junior securities of the operating companies in which they are interested. To them is very largely due the credit for the great development of the electric light and power business during the last ten or fifteen years. These investment companies have been the means of financing operating companies, which otherwise would have been impossible, and which are bringing to the smaller towns, hamlets, and rural districts the same class of twenty-four-hour electric service that is supplied to the larger cities.

Serving Rural Communities

When one studies the United States census figures for 1920 and finds that there are only 287 cities with populations of 25,000 people or over, but that there are 2,500 cities and towns with populations below 25,000 having an aggregate population of 16,534,489, and that there are 8,969,241 people living in unincorporated communities of less than 2,500 population, they can better appreciate what these investment companies are doing through the operating companies they have helped to finance in improving conditions for this large proportion of the population living in the smaller communities. When, in addition, one con-

siders that there is a rural population of 42,436,776, comparatively few of whom have yet been reached, one can well appreciate that without these investment companies, with their massed capital, it would be practically impossible for a very large part of the population which is now served or will be served, to have enjoyed the advantage of up-to-date electric service. We should bear in mind that only 35 per cent of the population are in the towns of 25,000 and above.

I am familiar with one investment company which is interested in operating companies serving an aggregate of 633 communities with a combined population of only 1,500,000, or an average of less than 2,500 people per community. The combined gross earnings of the operating companies of this group are approximately $30,000,000 per year and the investment company has invested in the operating companies over $40,000,000.

These investment companies, having such large investments in the operating companies, are looked to by the individual investor in those companies to see that they are properly financed, operated and managed. The investment company for its own protection must necessarily do this and can afford to gather around it for this purpose a force of experts in utility operation. Owing to the large aggregate purchasing power of such groups of operating companies, they can buy their machinery and supplies at the lowest market prices.

The investment company, moreover, due to its financial influence and as a result of its credit, can arrange for the placing of the bonds and preferred stock of its operating properties on a better basis than the operating companies could themselves. In times of financial stress, when it may be practically impossible for comparatively small operating companies to finance themselves at all, the investment company can use its larger credit to provide money temporarily or permanently for those of its operating companies needing assistance. The risk of the investment company is so spread that it can afford to help carry some of its operating companies through times of bad business which they as individual units might find hard to go through. This condition was particularly marked in the hard times which the utilities went through during the war. It probably was quite a factor in the particularly good record of the electric light and power industry in going through that period with practically no failures.

Investment Companies Assume Risk

The position of the investment companies as the common stockholders of the operating companies is an extremely important one. It puts the common stock in strong financial hands and stabilizes the whole financial structure of their operating companies. They must make the other securities, all senior to theirs, good both as to principal and return before their principal or return is assured. They take the chief risk of the business and are entitled, as a result of the risk, their knowledge of the utility business, and their responsibility to the senior holders and the public as utility operators, to dominate and direct the operating companies they have organized and financed.

The investor who loans expects the interest on his loan to be earned at least twice over, and looks askance at any light and power company that earns its bond interest less than one and three-quarters times. The partner who has bought preferred stock expects his dividends earned from one and one-half to two times over. To keep this balance, a certain proportion of all new money must necessarily be provided by common stock. The financial strength of the investment

companies enables them to continue to supply this money for the common stock. Operating companies could possibly for a time finance with bonds and preferred stock, but not indefinitely, because the margin between preferred dividends and earnings would be getting less and less as the proportionate equity in common stock became less, until their preferred stock would no longer be attractive to the investor.

It is necessary that some one interest stand behind the financing of these operating companies, and what better interest could there be than the investment companies, who in their turn are owned by the public and in many cases to some extent by the very public that some of their operating companies serve. In order to be successful these investment companies must establish a high credit rating, not only with banks and investment houses, but with investors themselves. They must establish a high reputation for common honesty and for managerial and engineering skill. For their money they are entitled to a fair wage of capital; for their managerial and engineering skill, the fair wages of skilled professionals. And their interests and the public's are identical in making the credit standing of their operating companies so strong that they can be financed just as far as possible by the sale of their securities to the public.

In the last analysis the interest in the utility business of the investor, the operator, the public, and the regulatory bodies is a common interest.

The development we have seen in the electric light and power business is great; but, with the proper cooperative treatment of the problems of the industry, the developments of the past will be small as compared with those of the future. The public interest in the development of the utilities should be so safeguarded that there can be no possible question as to their ability to so develop that they can at all times supply the demands made upon them by the public, whose business and social life is becoming more and more dependent upon the services of the utilities.

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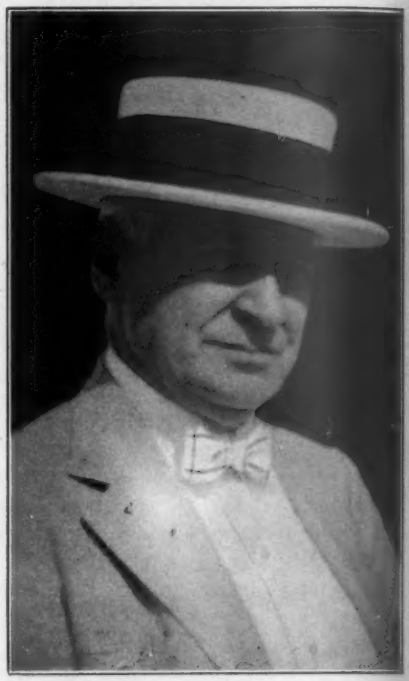
The Tax-Exempt Constitutional Amendment Fails to Pass

While the vote in the House on the tax-exempt amendment is disappointing, it only means a postponement of the matter. The unfavorable action of the House does not end the matter since the resolution will be introduced again at the next Congress. Friends of the resolution are therefore urged to keep up the agitation for its passage.

An analysis of the vote shows that substantial progress has been made over last year even though failing to secure a two-thirds vote of the House. The tabulation of the vote shows that twenty-four more favorable votes were cast this year when the amendment was lost than last year when it passed the House.

Robert Anderson Carter



THERE HAS ALREADY been recorded in the journals of the utility industry and in the daily press, the death, on February 4th, of Robert A. Carter, for many years a vice-president of the Consolidated Gas Company of New York and from his boyhood connected with the gas business in that city. No measure of tribute can be complete unless it includes some acknowledgment of the contribution he made toward the progress of the gas industry of the nation, for the sphere of his influence extended beyond the great corporation in which he played such an active part and left his imprint indelibly stamped upon the page of progressive and constructive thought in clarifying the economic laws and conditions upon which the stability of public utility properties depends.

A deep student of economics and of the fundamentals underlying the various and oft-conflicting theories of utility rate structure, he was unceasing in his effort to solidify the utility industry in upholding the constitutional bulwark of property rights. The addresses that he delivered, as well as the articles that came from his pen, had as their main objective the establishment of a common ground upon which the utilities would stand in united support of sound economic principles.

This magazine a month ago published as its leading article an address recently delivered by Mr. Carter, "The Fallacies of Depreciation Theories as Applied to Public Utility Properties." It was his last public utterance upon a subject of which he had made a long and thorough study. Presented in his characteristically forceful manner, it is typical of the service he rendered in promoting discussion and consideration of an absorbing and vital question. It has been said, and we believe will find general agreement, that Mr. Carter's contributions of this character, more than any other single force, have led to the deeper study and the more intelligent and searching consideration, on the part of the utility industry, of the rate making and valuation problems that have confronted it.

Through such activities his efforts exerted a tremendous force, but almost as important and effective was his response upon the many occasions when his assistance was called for in the preparation of briefs and arguments in support of the principles for which he had declared. There are many to testify to the unselfish service he rendered in this way.

In 1921, in collaboration with Judge Wm. L. Ransom of the New York Bar, Mr. Carter filed with the Depreciation Section of the Bureau of Accounts of the Interstate Commerce Commission the notable memorandum "Depreciation Charges of Railroads and Public Utilities." No document relating to that subject has had a wider influence in focusing attention upon vital and fundamental facts connected with the utility industry. It has stimulated intensive study and careful consideration of the underlying principles that must be established on sound lines for the preservation of public utility property. It called to the attention, not only of students of public utility problems, but of utility executives and managers, the necessity for establishing correct and unassailable practices if utility property rights were not to be jeopardized. Perhaps not all will agree with the views expressed therein, but there will be few who will not realize that this and other similar contributions of his remarkably fertile mind, have stimulated intensive study and to a very great extent have clarified the facts surrounding these much discussed problems.

Mr. Carter stood unalterably against the theory of preconceived "life of property" and saw in that and similar theories the application of principles fundamentally unsound and insupportable. In the conflict of views on depreciation there was an alignment of the facts—arrayed against theories. It was Mr. Carter's view that the facts could be shown and proved—the theories were no more than a speculative and conjectural tissue—and to a man of his practical mind only one choice was possible. From the early years of rate litigation he argued that there is no ascertainable life expectancy for utility property, and he denied the possibility of forecasting, or even satisfactorily guessing, the useful life in terms of years. And he regarded as equally unsound the proposition to set up reserves for obsolescence, for no one could tell at what time in the remote future improvements in the science would justify or necessitate retirement of property because time had rendered it obsolete or inadequate. It was his contention that property used in public service does not go out of use on arbitrary or theoretical grounds, nor can its useful life be computed by any formula or rule and that, consequently, depreciation, as it had come to be called, did not, and under proper management and upkeep of the property, could not occur. Upon that basis he regarded the creation of so-called depreciation reserves accumulated out of operating expenses as unnecessary and improper and looked upon it as undermining the integrity of the investment.

He worked constantly for the development of a greater sense of unity, common interest and cooperation between the different groups of public service enterprises in the treatment and handling of valuation and rate-making questions, for he regarded the problem as common to all public service industries and was deeply conscious that the principles of valuation determined in one case tended to become of controlling precedence in others.

As chairman of the Association's Committee on Rate Fundamentals, his energies were largely directed to promoting a better understanding of the disputed questions under consideration and no one realized better than he that agreement was only to be reached through discussion of divergent views and as the result of sound reasoning.

The work of his committee had not been brought to completion—of necessity it awaited, as he pointed out—"the decisions of the courts upon many of the

mooted questions involved in cases now on their way to final adjudication" but the aid and counsel rendered to member companies by the committee were of great and lasting value. Some measure of the importance of Mr. Carter's contribution to this subject and the extent to which he stimulated thought and discussion will be found in the fact that the trend of decision is unmistakably against deducting accrued theoretical depreciation from the so-called "rate-base" and providing for it in the rate.

He was an enthusiastic supporter of the Uniform Classification of Accounts adopted by the National Association of Railway and Utilities Commissioners, and also by the American Gas Association and the National Electric Light Association, and was a moving force in extending its use. The sum of his activities—quite apart from those devoted to the corporation in whose affairs he was such a vital force—leave a lasting record in the annals of utility progress, and the value of his contributions will become more universally recognized with the passing of time.

Amendment to Constitution, Effective February 1, 1924

The membership has approved of an amendment to the Constitution of the Association by which students in universities, colleges and scientific institutions become eligible to Class C membership with full privileges now accorded to that class of membership. Section 5 of Article III, embodying this amendment, is now as follows:

Section 5. Class C members shall be instructors, teachers, *or students* in universities, colleges, scientific institutions, or members of the staffs of state utility commissions, government or state bureaus, interested in or having jurisdiction or supervision of gas companies, or who through research or otherwise are interested in or contributing to the advancement of the gas industry, and are not engaged in consulting engineering practice. They may become Class C members for the current fiscal year in which they are enrolled upon invitation of the Executive Board, which invitation must be renewed annually.

Class C members shall be entitled to attend and vote at all general and sectional meetings.

GENERAL

CHAIRMEN OF GENERAL COMMITTEES ORGANIZED TO DATE

Accident Prevention—F. W. Fisher, Rochester, N. Y.
Amendments to Constitution—Wm. J. Clark, Mt. Vernon, N. Y.
American Engineering Standards Committee, Representative on—A. H. Hall, Cambridge, Mass. —(Alternate Representative) W. J. Serrill, Philadelphia, Pa.
Award of Beal Medal—J. B. Klumpp, Philadelphia, Pa.
Chamber of Commerce—R. B. Brown, Milwaukee, Wis.
Cooperation with Educational Institutions—W. G. Gribbel, Philadelphia, Pa.
Customer Ownership—Chas. A. Munroe, Chicago, Ill.
Education of Gas Company Employees—B. J. Mullaney, Chicago, Ill.
Finance—James Lawrence, New York, N. Y.
Gas Code—W. R. Addicks, New York, N. Y.
Gas Standards and Service—R. B. Harper, Chicago, Ill.
National Fire Protection Association—R. S. Doull, New York, N. Y.
Nominating—H. A. Norton, Boston, Mass.
Rate Fundamentals—
Representation on National Joint Committee of Public Utility Associations—D. D. Barnum, Boston, Mass.; R. B. Brown, Milwaukee, Wis.; R. A. Carpe, New York, N. Y.; H. L. Doherty, New York, N. Y.; A. Forward, New York, N. Y.; C. H. Ginn, Philadelphia, Pa.; J. B. Klumpp, Philadelphia, Pa.; A. P. Layhrup, New York, N. Y.; Chas. A. Munroe, Chicago, Ill.
Standard Gas Appliance Specifications—W. T. Rasch, New York, N. Y.
United States National Committee of International Commission on Illumination, Representatives on—Howard Lyon, Gloucester, N. J.; E. H. Earnshaw, Newark, N. J.; G. G. Ramsdell, New York, N. Y.

Municipal Ownership Survey of the Manufactured Gas Industry

The following survey is based on figures obtained from the 1923 edition of Brown's Directory of American Gas Companies.

Of the 966 gas utilities in the country, only 51, or 5 per cent, are municipally owned or operated, while the total annual sales of gas for the two classes shows that those under municipal management are selling only 6,000,000,000 cubic feet as against 365,000,000,000 cubic feet sold under private management, or 1½ per cent.

Other figures on meters, miles of mains, and population served, make the contrast even more striking. For example, of the more than 9,000,000 meters in use, municipal companies can account for less than 153,000. Of the 70,000 odd miles of gas mains in the United States, the municipal companies have less than 1,900, and out of a total of 45,000,000 people served by manufactured gas, only 762,000, or less than two per cent, get their gas from city-owned plants.

The survey shows that the 51 municipal properties are situated in 21 states, the largest number of plants for a state being Minnesota with 6, Virgina with 5 and Georgia, Iowa and Massachusetts with 4 each. The largest plant under municipal control is Omaha, Nebraska, with total annual sales of 1,396,000,000 cubic feet. The two next in line are Richmond, Virginia, with sales of 1,150,000,000 cubic feet and Duluth, Minnesota, with sales of 802,800,000 cubic feet. These three companies alone, according to official statistics, sell approximately 80 per cent of the total amount of gas sold by all the city-owned plants in the country. The remaining 20

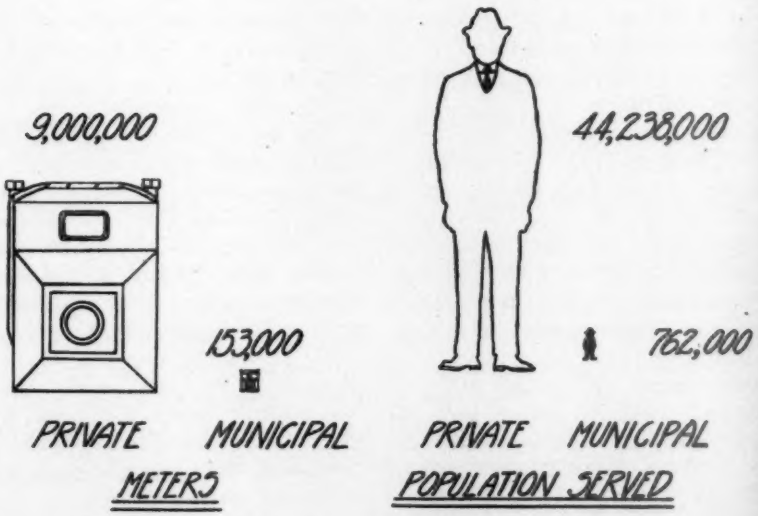
per cent is sold by companies operating in small towns, summer resorts and hamlets, with 24 companies having less than 20 miles of gas mains per company.

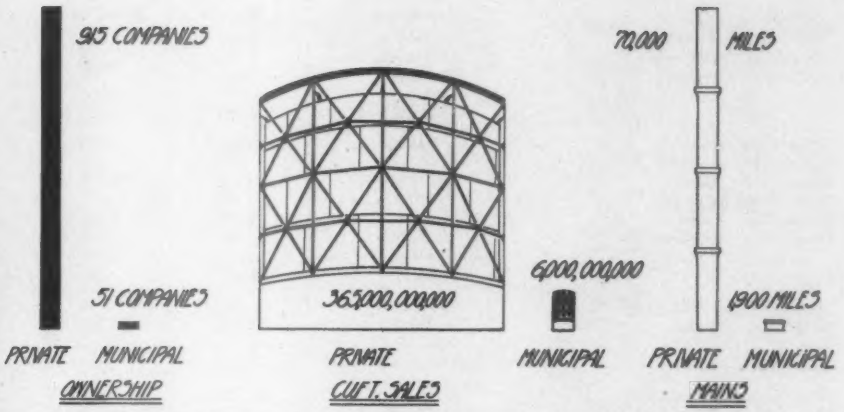
As against the 6,000,000,000 cubic feet of gas sold annually by all the municipal plants combined, statistics show that the Peoples Gas Light and Coke Company, of Chicago, sold 27,600,000,000 cubic feet, while other private undertakings in cities picked at random reported sales as follows: Philadelphia, 18,000,000,000 cu. ft.; Baltimore, 9,300,000,000 cu. ft.; Boston, 8,600,000,000 cu. ft.; St. Louis, 7,000,000,000 cu. ft.; and San Francisco, 6,000,000,000 cu. ft.

Commenting on municipal ownership in the gas industry, the Committee on Public Ownership and Operation, of the National Association of Railway and Utilities Commissioners, says in a report just issued:

"The number of gas plants operated by municipalities and the volume of output of such plants are both insignificant when compared to the number of gas plants and volume of output under private management. Your committee knows of no instance where there is the slightest reason to believe that any advantage whatsoever has accrued to the public in those few instances where gas plants are owned and operated by the municipality. It is the opinion of your committee that no gas plant operated by a municipality can or does give as good service in all respects as would be given by a privately operated plant."

The following tabulations give the figures by states of gas sales, meters and miles of mains of the municipally owned plants. And the diagram pictures graphically these same quantities together with the number of companies and population served by both privately and municipally owned plants.





State City	Gas Sales	Meters	Miles of Mains
Alabama, Talladega	19,800,000	600	12
Arizona, Winslow	6,000,000	350	7
Arizona, Mesa	12,000,000	390	10
Total	18,000,000	740	17
California, Avalon	8,495,000	583	2
California, Palo Alto	94,035,000	2,008	28
California, Santa Clara	18,000,000	750	20
Total	120,530,000	3,341	50
Connecticut, Norwich	100,000,000	4,214	73
Florida, St. Petersburg	113,455,000	8,108	50
Florida, Tallahassee	7,500,000	386	8
Total	120,955,000	8,494	58
Georgia, Albany	25,000,000	900	15
Georgia, Cartersville	5,000,000	350	10
Georgia, Dalton	8,000,000	300	12
Georgia, LaGrange	18,000,000	723	12
Total	56,000,000	2,273	49
Iowa, Newton	15,900,000	860	17
Iowa, *Carroll	15,000,000	800	15
Iowa, *Estherville	15,000,000	900	15
Iowa, Webster City	13,500,000	1,057	11
Total	58,400,000	3,617	58
Kentucky, Henderson	15,000,000	800	14
Maryland, Easton	6,000,000	340	5
Massachusetts, Holyoke	291,920,000	14,697	65
Massachusetts, Middleboro	12,298,000	904	11
Massachusetts, Wakefield	56,144,000	2,967	45
Massachusetts, Westfield	53,000,000	3,107	35
Total	413,362,000	21,675	156

State City	Gas Sales	Meters	Miles of Mains
Michigan, Escanaba	43,000,000	1,286	18
Michigan, Ironwood	24,000,000	1,173	12
Michigan, Ypsilanti	70,252,000	2,127	26
Total	137,252,000	4,586	56
Minnesota, Duluth	802,800,000	16,800	190
Minnesota, Hibbing	28,000,000	630	12
Minnesota, Jasper	2,190,000	150	3
Minnesota, Renville	1,000,000	80	2
Minnesota, Virginia	44,000,000	1,396	12
Minnesota, Hopkins	7,572,000	370	8
Total	885,562,000	19,426	227
Nebraska, Central City	3,900,000	286	8
Nebraska, Omaha	1,396,000,000	39,456	351
Total	1,399,900,000	39,742	359
New Jersey, Paulsboro	42,750,000	1,262	10
New Jersey, *Sea Isle City	4,500,000	190	5
Total	47,250,000	1,452	15
New York, Bath	10,000,000	656	10
North Carolina, Rocky Mount	84,971,000	2,335	26
North Carolina, Statesville	4,700,000	305	14
North Carolina, Wilson	54,780,000	775	25
Total	144,451,000	3,415	65
Ohio, Bellefontaine	70,000,000	2,044	20
Ohio, Ripley	1,900,000	175	4
Ohio, Lebanon	4,000,000	221	5
Total	75,900,000	2,440	29
South Dakota, Dell Rapids	4,450,000	325	7
Virginia, Alexandria	56,683,000	3,000	22
Virginia, Charlottesville	47,000,000	1,452	26
Virginia, Danville	127,000,000	3,375	30
Virginia, Fredericksburg	21,500,000	845	9
Virginia, Richmond	1,150,000,000	24,500	500
Total	2,402,183,000	33,172	587
Wisconsin, Fort Atkinson	2,000,000	771	11
Pennsylvania, Schuylkill Haven	2,900,000	300	7

*Estimated.

TOTALS BY STATES

State	No. Plants	Gas Sales	Meters	Miles of Mains
Alabama	1	19,800,000	600	12
Arizona	2	18,000,000	740	17
California	3	120,530,000	3,341	50
Connecticut	1	100,000,000	4,214	73
Florida	2	120,955,000	8,494	58
Georgia	4	56,000,000	2,273	49
Iowa	4	58,400,000	3,617	58
Kentucky	1	15,000,000	800	14

State	No. Plants	Gas Sales	Meters	Miles of Mains
Maryland	1	6,000,000	340	5
Massachusetts	4	413,362,000	21,675	156
Michigan	3	137,252,000	4,586	56
Minnesota	6	885,562,000	19,426	227
Nebraska	2	1,399,900,000	39,742	359
New Jersey	2	47,250,000	1,452	15
New York	1	10,000,000	656	10
North Carolina	3	144,451,000	3,415	65
Ohio	3	75,900,000	2,440	29
Pennsylvania	1	2,900,000	300	7
South Dakota	1	4,450,000	325	7
Virginia	5	2,402,183,000	33,172	587
Wisconsin	1	2,000,000	771	11
21	51	6,039,795,000	152,379	1,865

The 1924 Convention

THE SIXTH ANNUAL CONVENTION and Exhibition of the Association will be held in Atlantic City, the week of October 13, 1924.

In making this announcement we quote from the report of the special committee consisting of Messrs. Charles A. Munroe, H. C. Abell, George W. Parker, Wm. M. Crane and R. B. Brown, Chairman, which report was submitted and unanimously accepted by the Executive Board at its meeting on December 19, 1923.

"Your Committee on Time and Place of the 1924 A. G. A. Convention, by unanimous vote have decided to recommend to your Board that the Association meet again at Atlantic City next Fall..... Two of the members believe that the meeting should come west next year regardless of the question of accommodations for exhibit.

"It is suggested .... that we possibly are placing too much emphasis upon the exhibit and upon the necessity of holding an exhibit every year ..... it is very possible that an occasional meeting without an exhibit would not detract from the interest, and an occasional respite from the burden of preparing and carrying on the exhibit, might be welcomed by our manufacturer members."

As last year, the Steel Pier will be used again. Many permanent structural improvements are to be made on this pier during this winter and summer, which will greatly increase its facilities for exhibition purposes, allowing a bigger and more effective exhibit than ever before. This same pier will also house the general meetings as well as some of the sectional meetings as in previous years.

With the increased facilities that will be available, the Sixth Annual Convention and Exhibition should be by far the most comprehensive and instructive meeting ever held by the gas industry.

Affiliated Association Notes

New England Association of Gas Engineers

Approximately 300 attended the two-day Convention of this Association held at the Copley-Plaza Hotel, Boston, on Feb. 13 and 14.

Mr. C. E. Paige, the retiring president, presided at the first day's session. The extensive discussion given on all papers and questions put up for discussion proved very interesting. The following officers were elected for the coming year: President, C. R. Pritchard; 1st Vice-President, H. N. Cheney; 2nd Vice-President, F. C. Freeman; Directors, A. G. Smith, G. W. Stiles, A. H. Scott, F. E. Drake and H. Vittinghoff.

Addresses were given by President C. E. Paige, Hon. Henry G. Wells of the Department of Public Utilities of Massachusetts, Alexander Forward of the American Gas Association, Sir Arthur Duckham and S. T. McQuarrie, the Director of the N. E. Bureau of Public Utility Information. Mr. Walton Forstall emphasized in a talk the necessity of cooperation with the A. G. A. Committee in its efforts to establish a standard schedule of meter capacities. Mr. W. A. Doering urged action in securing the adoption of the Uniform Classification of Accounts in those New England states which have not adopted the Classification.

The following papers were read: "Tar—Its Distillation and Crude Derivatives," J. H. Readio; "Continuous Inventory of Fixed Capital," A. J. Smith; "The Gas Company as a Merchandiser—More Effort—More Sales," J. J. Quinn, Quincy, Mass.; "The Action of Gas on the Oil in Diaphragm Leathers," T. A. Mighill; and "Backrun Apparatus at the Worcester Gas Light Co.," E. H. Bauer.

Several contributions were made in the discussion of each of the following subjects and questions: "Internal Corrosion of Holders," "Results of Liquid Purification," "Results of Changes in Method of Charging for Gas Service," "What Does Your Steam Cost per M at the Boiler?" "Life of Steel Mains in Cities," "What Is the Policy of the Companies in the Matter of Insurance?" and "Gummy Deposits in Distribution Systems."

Wisconsin Utilities Association

The Wisconsin Utilities Association has announced the tentative program of its Annual Convention to be held at the Hotel Pfister in Milwaukee, Wis., April 17 and 18.

The general sessions will be held in the forenoon with club luncheons at noon followed by the five sectional meetings in the afternoon. The Annual Dinner will be held on April 18.

The general session includes addresses by President Harold L. Geisse, Halford Erickson, vice-president, Byllesby Engineering and Management Corporation; W. S. Vivian, Middle West Utilities Company; Commissioner Adolf Kanneberg, Railroad Commission of Wisconsin, and J. W. Hart, Elliott Service Company.

The following will present papers at the Gas Section meetings: Professor O. L. Kowalke and R. L. Rundarff of the University of Wisconsin; G. H. Waring, and N. T. Sellman of the American Gas Association.

Affiliated Association Notes

Illinois Gas Association

Mr. R. V. Prather, Secretary-Treasurer of the Illinois Gas Association has announced some of the details in connection with the Annual Convention of the Illinois Gas Association which is to be held jointly with the Illinois State Electric Association and the Illinois Electric Railways Association in the Hotel Sherman, Chicago, on March 26 and 27. A joint session will be held on the morning of March 26 and will be devoted to the Illinois Committee on Public Utility Information and the Larger Speaking Campaign. Mr. Floyd Parsons has been secured as one of the speakers for the banquet to be held on the evening of March 26. Mr. Alexander Forward, of the American Gas Association, Mr. M. H. Aylesworth of the National Electric Light Association, Mr. B. I. Budd of the American Electric Railway Association, and Mr. J. P. Barnes will be the speakers at the joint session on the morning of March 27. The subjects for addresses and papers at the meeting of the Gas Association are as follows: "Super-Heating and Water Gas Machine," "Backrun Progress in Water Gas Machine," "Gas in the Hotel and Restaurant," "Recent Development in House and Water Heating," "Safety as Applied to the Gas Business," and a Report of Fellowships maintained at the University of Illinois by the Association.

Southern Gas Association

An attractive tentative program has been announced for the sixteenth Annual Meeting of the Southern Gas Association to be held in Augusta, Ga., on April 22, 23, and 24 as follows: "The Public Utility Employee's Place in the Activities of His Community," Preston S. Arkwright; "The Doherty System of Sales Remuneration in the Gas Companies," E. J. McGlinchey; "Advertising and Selling Gas," John Paul Lucas; "How to Get the Greatest Benefit from an Association Meeting," L. I. Pollitt; "Mechanical Aids in the Accounting Department," F. A. Brine; "How Best to Pass on the Information Contained in Gas Journals to the Employees," A. D. Whittaker, and "Refractories," A. F. Graves Walker.

The entertainment features, as planned, are extensive and include an Augusta Barbecue.

Pacific Coast Gas Association

A sectional meeting of the Pacific Coast Gas Association was held on January 18, in San Francisco, concluding with a Get-together Dinner in the evening. Members were present from the entire Pacific Coast. The day was given over to general discussion, association policy and the active work that has been performed by different committees. At the conclusion of the dinner, Dr. J. W. Sherman gave an exceptional talk upon the practice of the Golden Rule within the industry and the responsibility of being a gas man.

The next sectional meeting is scheduled for Seattle on April 24.

The Divisional Meetings of the Chamber of Commerce of the United States

THE FOLLOWING MEMBERS were appointed by President J. B. Klumpp to represent the American Gas Association at the four Divisional Meetings of the Chamber of Commerce of the United States.

Meeting of Eastern Division held in Philadelphia, Pa., January 17 and 18.

J. B. Klumpp, Chairman, Philadelphia, Pa.

A. E. Forstall, New York, N. Y.

Grier Hersh, York, Pa.

W. R. Addicks, New York, N. Y.

Meeting of Northern Central Division held in Chicago, Ill., January 21 and 22.

R. B. Brown, Chairman, Milwaukee, Wis.

Chas. A. Munroe, Chicago, Ill.

I. C. Copley, Aurora, Ill.

Meeting of Southern Central Division held in New Orleans, La., January 24 and 25.

H. C. Abell, Chairman, New York, N. Y.

C. B. McKinney, Dallas, Texas.

Herbert Flowers, New Orleans, La.

Meeting of Western Division held in San Francisco, Calif., January 29 and 30.

C. O. G. Miller, Chairman, San Francisco, Calif.

A. B. Macbeth, Los Angeles, Calif.

W. S. Yard, San Francisco, Calif.

The American Red Cross Uses Our First Aid Booklet

We quote from a letter recently received from the National Headquarters of the American Red Cross:

"Please accept my thanks for your letter advising us of the donation of fifty copies of the booklet 'First Aid and Resuscitation in Gas Asphyxiation.' The American Red Cross appreciates the courtesy extended by your Association.

"As you probably know, we have been teaching and advocating the use of the prone pressure method in our First Aid Work, also in our Life Saving Work.

"We were particularly anxious to have a few copies of this book, because it gives a brief but thorough statement of the experiences and recommendations of a group of people who have devoted considerable time to the study of this subject.

"I believe that your booklet will do much towards standardizing the method and giving a better general understanding of the entire subject."

ACCOUNTING SECTION

W. A. SAUER, Chairman — H. C. DAVIDSON, Vice-Chairman.
H. W. HARTMAN, Secretary

MANAGING COMMITTEE—1924

ARMSTRONG, J. J., Toronto, Can. (Canadian)
BARTON, W. H., Portland, Ore.
BISSELL, J. H., Boston, Mass.
BLANCHFIELD, J. J., Brooklyn, N. Y.
CLINTON, DEWITT, Worcester, Mass. (N. E. Gas Eng.)
DOMINO, W. A., Boston, Mass.
FREY, H. F., Allentown, Pa.
HAASE, EWALD, Milwaukee, Wis. (Wisconsin)
HALL, I. S., Boston, Mass.
HEINS, J. W., Philadelphia, Pa.
HOFFMAN, F. C., St. Paul, Minn.
JAMES, F. M., Aurora, Ill. (Illinois)
JAMES, W. H., Petersburg, Va. (Southern)
KELLER, A. R., Syracuse, N. Y.
KURTZ, ADAM, Detroit, Mich. (Michigan)
LAWALL, H. J., Philadelphia, Pa.
LAWRENCE, JAMES, New York, N. Y.
MEYERS, W. J., New York, N. Y.
MURFIT, W. G., Newton, Pa.
PAGE, HOMER, Charleston, S. C.
PATTERSON, F. H., Rochester, N. Y.
PETTES, W. H., Newark, N. J. (New Jersey)
PHILLIPS, R. E., Lincoln, Neb. (Iowa)
PORTER, EDWARD, Philadelphia, Pa. (Pennsylvania)
POTTER, C. F., Newark, N. J.
REESE, J. G., Baltimore, Md.
REYNOLDS, A. E., Springfield, Mo. (Missouri)
SCHMIDT, WM., JR., Baltimore, Md.
SCOTT, J. M., Wilmington, Del.
SEARLE, A. A., New York, N. Y.
SHORT, A. F., Providence, R. I.
TOSSELL, A. L., Chicago, Ill.
TRACY, F. B., Muncie, Ind. (Indiana)
WILBUR, A. A., Brockton, Mass. (Gas Sales of N. E.)
WINTERS, A. C., Chicago, Ill.

CHAIRMEN OF SECTIONAL COMMITTEES ORGANIZED TO DATE

Analysis of Gas Company Statistics—H. J. LAWALL, Philadelphia, Pa.
Budget—F. H. PATTERSON, Rochester, N. Y.
Customers Accounting—H. J. FREY, Allentown, Pa.
Insurance—J. G. REESE, Baltimore, Md.
Nominating—J. W. HEINS, Philadelphia, Pa.
Relations With Customers—DEWITT CLINTON, Worcester, Mass.
Improving Relations Through Employees Visiting Customers' Premises—W. H. BARTON, Portland, Ore.
Errors, Their Correction and Prevention—J. M. ROBERTS, Chicago, Ill.
Security Holders' Records—E. MACMORRIS, Philadelphia, Pa.
Welfare Systems—O. F. POTTER, Newark, N. J.
State Representatives and Contributions to Monthly—A. L. TOSSELL, Chicago, Ill.
Uniform Classification of Accounts and Form of Annual Report to Public Service Commissions—W. J. MEYERS, New York, N. Y.

Unit Plan of Accounting for Public Utilities

H. J. JOHNSON, New York, N. Y.

This system was presented to the Committee on Customer's Accounting as a proposed modification of "Bookkeeping Without Books." It is submitted merely for the information of our members and does not carry the endorsement of the Committee. (EDITOR'S NOTE.)

THIS PLAN OF accounting is the result of a very extensive and exhaustive survey of the system known as "Bookkeeping Without Books" as well as requirements of consumers' accounting in general. The survey covered a large number of companies throughout the country, both large and small.

In designing this plan the aim has been to overcome every objection which could possibly be found and put in its place a feature of real value, as well as to retain every good feature. In addition to this, this plan provides a number of accuracy and control methods.

The system as outlined here is exceedingly rapid in its operation as well as one hundred per cent complete in every respect and is designed to meet the most exacting requirements. If, however, certain features are not considered necessary, they may be eliminated without affecting the general plan. The description which follows covers the complete plan.

Contruction of Bills

The form of bill shown in Fig. 1 is suggested as being the most practical form for use with the "Bookkeeping Without Books" system. It will be noted that a carbonized flap is provided by means of which a full copy of the bill is secured to be used as the Consumer's Ledger Record, thus furnishing a much more complete record than that secured when only a stub is used. A Collector's Stub is made as a copy of the Cashier's Stub. The purpose of providing this on one hundred per cent of the accounts will be explained later.

The cost of these bills, because of the method of manufacture, is practically the same as without the carbon. If it is desired to have them printed locally, the carbonized paper, cut the proper size, may be purchased by the local printer.

Consumer's Bill and Abstract Sheet

The form of bill shown in Fig. 2 shows the present and previous readings with a distribution of the consumption into minimum, first, second, third and fourth rates. The amount of the charge is extended on both the bill and the stub. The purpose of the folio and line number will be explained later. A form of bill providing a discount is shown in Fig. 5.

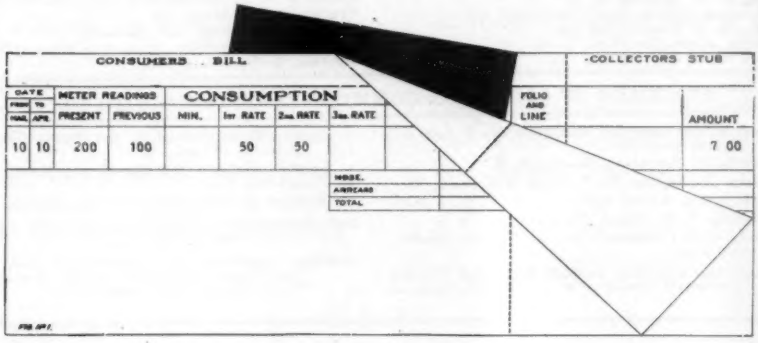


Fig. 1.

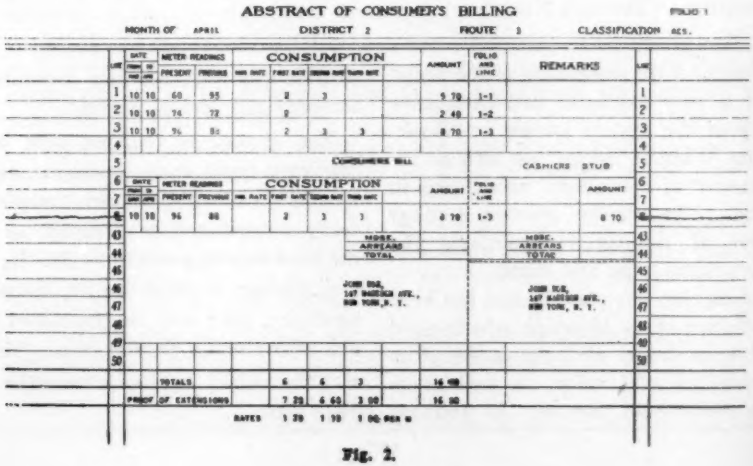


Fig. 2.

The Abstract Sheet shows a full copy of every bill written and becomes a continuous record of all the billing. Each column is automatically totalled. These sheets are filed by routes and districts and become the basis for all statistical records. The liquidation section will be explained later.

Description of Machine

This machine, Fig. 3, has been especially designed for this particular kind of work. The Abstract Sheet is held in the machine by means of auxiliary feed rolls, one at each end of the cylinder, and is spaced up only one line at a time. As a bill is completed, the machine is automatically opened and the bill released. The completed bill is removed from the front and the new bill inserted in the same manner. As the carriage is returned the machine is automatically closed. The impression on the Abstract Sheet is secured by means of the duplicate ribbon.

Fig. 3.

Billing Operation Explained

The previous reading is automatically subtracted from the present reading and the amount of the consumption extended and distributed into the proper rates. A positive proof is secured that the correct amount of consumption is distributed. The amount of the charge is secured from a chart. If the rate is subject to a discount it is automatically deducted and the net charge extended. A separate total of the consumption at each individual rate is automatically secured, as well as separate totals of gross, discount and net.

Positive Proof of Billing and Extension of Amounts

If the total of the consumption, as accumulated in the machine, agrees with the total of the consumption as extended in the meter reading books, it furnishes a positive proof that every reading has been correctly transcribed and that no meter index is skipped. It also furnishes a mechanical audit on the extension as made in the meter reading book.

A positive proof that the correct charge has been extended on each bill is secured by simply multiplying the rate by the total consumption at each rate. A cross total of the earnings at the various rates must agree with the total of the charge column. This proof may be secured at the bottom of each sheet, if desired.

Arrears and Sundry Charges

It has not been considered practical to enter arrears and sundry charges on the consumers' bills with the machine for the reason that it would make it necessary for the billing operator to watch several mediums at the same time, which would necessarily decrease the speed of operation and increase the liability of errors. Another objection was that if separate columns were to be provided for each classification of such charges, it made the bills too wide. This form, Fig. 4, overcomes all these objections.

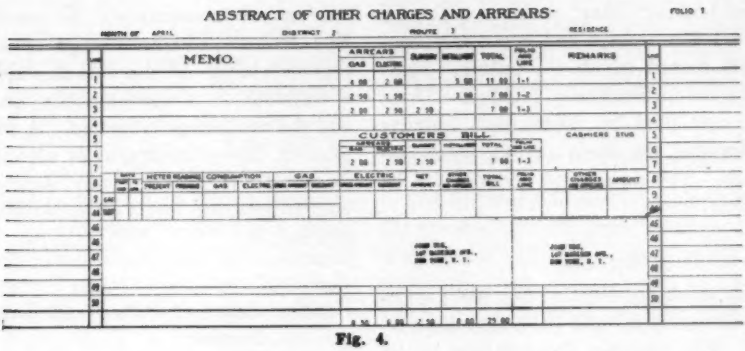


Fig. 4.

As soon as the bills have been addressographed and while the meters are being read, the amounts from the unpaid bills, as well as sundry and installment charges, are entered in the space provided and the total extended. An abstract sheet is secured with a separate total of each column to balance with the various controls.

When the meter reading books have been received, the billing is done in the regular manner and after extending the amount of the bill the total of other charges and arrears is picked up and the final total of the bill extended. A total of these amounts picked up must agree with the amount in the total column of the abstract sheet of other charges and arrears.

Combination Bill Showing Discount

A combination bill, showing discount, is illustrated in Fig. 5. Both the present and previous readings of the gas meter are entered and the number of cubic feet consumed is extended in the gas consumption columns. The electric readings are then entered immediately below and the number of k.w. hours of electricity consumed is extended in the electric consumption column. Separate totals of cubic feet and k.w. hours are secured. The gross charge for gas and the amount of discount is then entered from a chart. The gross charge for electricity and the amount of discount is then entered in the proper columns and the net total of the bill which has been automatically computed is extended. The

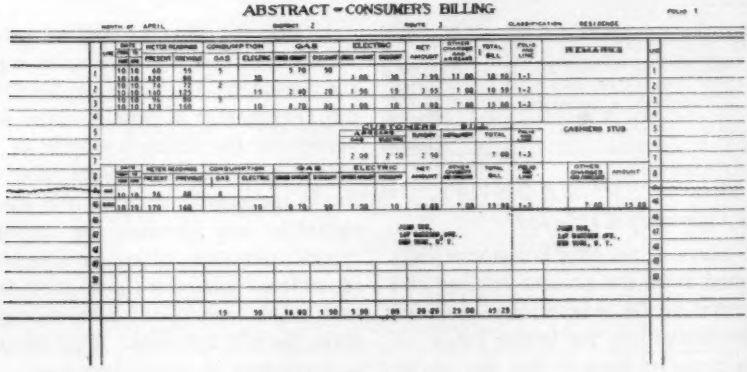


Fig. 5.

total of other charges and arrears is then picked up from the space immediately above and the final total of the bill extended.

Consumer's Ledger Record

This illustration, Fig. 6, shows the Consumer's Ledger Record which is a full and complete copy of the bill. This has the advantage of being secured as a by-product of the billing without any additional effort, in addition to furnishing the complete information.

CONSUMERS LEDGER RECORD

DATE FROM	DATE TO	METER READINGS PRESENT	METER READINGS PREVIOUS	CONSUMPTION					AMOUNT	FOLIO AND LINE	COLLECTORS STUB	AMOUNT
MAR.	APR.											
10	10	96	88		2	3	3		8 70	1-3		8 70
				LIQUIDATION			MDSE.				MDSE.	
				KIND	DATE	POSTED BY	ARREARS				ARREARS	
				CASH	4-20	PAID	TOTAL				TOTAL	
				ALLOWANCE			JOHN DOE, 147 MADISON AVE., NEW YORK, N. Y.				JOHN DOE, 147 MADISON AVE., NEW YORK, N. Y.	
				JOURNAL CREDIT								
				ADDITIONAL CHARGE								
				BALANCE DUE								

Fig. 6.

Desk for Consumer's Ledger Record

The standard tub desk, as shown in Fig. 7, is used. The trays are made the proper size to fit the bill. Each wing of the desk is provided with three trays in the bottom and two trays on top. These accounts in this type of equipment is exceptionally rapid.

Fig. 7.

Consumer's Remittance

As the remittance is received from the consumer, the cashier enters the amount received on the lower portion of the stub and detaches the stub. The bill is then receipted and returned to the consumer. The stubs are sorted and totalled by routes and districts and balanced with the total of cash received. The stubs are then cut or torn apart on the perforated line.

Liquidating Consumer's Accounts

The lower portion of the stub which shows the name and address of the consumer and the amount paid is matched up with the duplicate bills in the tub desk. After the duplicate bills have been removed they are stamped with a "Paid Stamp" showing date paid. If a partial payment is made, the actual amount is

entered and the unpaid balance extended, and the duplicate bill returned to its original position in the tub desk.

Liquidating Abstract Sheet

The upper portion of the stub which shows only folio and line number is matched up with the corresponding folio and line number on the abstract sheet, and the "Paid Stamp" entered on the proper line.

Consumer's Ledger Record Folder

A separate folder, Fig. 8, is opened up for each consumer and a complete record of the meter is shown on the face of it. When the duplicate bills have been removed from the tub desk and stamped "Paid," they are filed in these folders. A complete credit record for each consumer is thus secured. The folders are filed in a transfer case and indexed in the same manner as the unpaid bills.

The duplicate bills in this folder show at a glance how often the account has been delinquent by the number of collector's stubs that have been detached, as explained in the following paragraph.

Delinquent Accounts

The collector's stubs are detached from all duplicate bills remaining in the unpaid file on the delinquent date. These are either mailed to the consumer as a reminder of the bill or turned over to the Collection Department for their use.

Balancing Unpaid Accounts

A total of the duplicate bills remaining in the unpaid file at the end of the period must balance with the total of unpaid accounts as shown by the records of the control clerk. These totals are, of course, secured by routes and districts.

If there is a discrepancy in the balance, it may be quickly checked by comparing the unpaid bills with the open items on the abstract sheet. This also automatically proves that all credits have been posted to the correct account, that no unpaid bills have been removed from the file and that no other errors have been made in posting the credits. This will eliminate many complaints because the errors are found before the new bills are sent out.

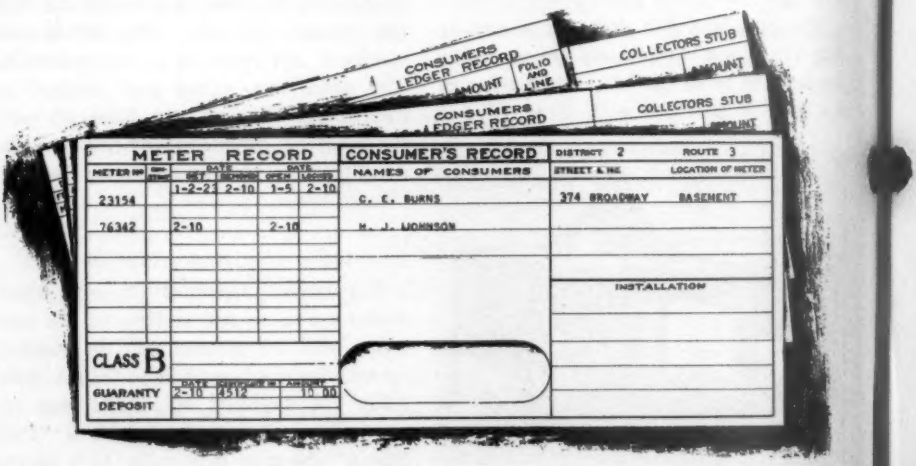


Fig. 8.

Control Clerk

A total of the consumption as extended in the meter reading books together with the total consumption as accumulated in the machine, during the operation of billing, are furnished to the control clerk. These totals must agree. The total amount of charges as well as amount of cash received and other credits by routes and districts are also given to the control clerk. This permits this person to exercise a positive control over the accounts at all times.

tribution columns may be provided on the abstract sheet to the right of the bill, if desired, and thus automatically secure a distribution of sales.

Objections Which Are Now Advantages

Complete meter and credit record is furnished without reference to meter reading book.

Complete statistical record, distribution of consumption, and earnings by

ABSTRACT OF MDSE. BILLING

MONTH OF APRIL DISTRICT 2 ROUTE 3 CLASSIFICATION APPLIANCES

	QUANTITY	DESCRIPTION	PRICE	AMOUNT	TOTAL	BILL NO.		
		H J JOHNSON 276 BEAVER AVE CITY 4321 TERMS $7 00 CASH $10 00 PER MONTH						
	1	STANDARD GAS RANGE		75 00				
	1	ACME LIGHTER		2 00	77 00	125		

CUSTOMERS INVOICE CASHIERS STUB

SOLD TO H J JOHNSON
YOUR NO. 4321

	QUANTITY	DESCRIPTION TERMS	PRICE	AMOUNT	TOTAL	BILL NO.		AMOUNT
	1	$7 00 CASH $10 00 PER MONTH						
	1	STANDARD GAS RANGE		75 00				
	1	ACME LIGHTER		2 00	77 00	125		77 00
		TOTALS		77 00	77 00			

Fig. 9.

Merchandise Accounting

The forms, as shown in Fig. 9, provide a bill in duplicate and a sales abstract sheet to be written at one operation in exactly the same manner as the consumer's billing. The duplicate bill is used as the ledger record to which the credits are posted. The abstract sheet is used as a sales record. A number of distribution columns may be provided on the abstract sheet to the right of the bill, if desired, and thus automatically secure a distribution of sales.

routes, districts, rates and major classifications.

Medium for auditing and analyzing accounts as required by public service commissions and local auditors.

Ledger record secured as by-product of writing bill. No extra operations.

All totals and abstracts of billing secured without extra effort.

✣ ✣ ✣

Gas Fuel

THE IDEA OF heating houses, factories and other buildings with gas served from a central station is by no means a twentieth century thought. The other day we were going through some old issues of the American Gas Light Journal and in the issue of September, 1877, we found the following article.

"Recent activity in the manufacture and sale of gas stoves has led to investigation, somewhat extensive in the matter of the daily use of the stoves, furnaces, and apparatus for heating and warming. As we consider, in the problem of power, time, distance, and weight, so should we, in the problem of artificial heat, question the advantage of time, convenience, and comfort.

"It will be unnecessary to detail an illustrated comparison of the coal stove or furnace with the gas burner, so far as cleanliness and convenience are concerned, for nearly everyone must at once accord to the gas burner its positive superiority. Granting at once that by using a gas apparatus we do away with dust, smoke, ashes, cinders, kindling material, labor, and save time, which is truly money in this instance, we have a strong basis at the outset for commendation; and to fully comprehend the comparative merit of the use of gas as a fuel, let us first consider the adaptability of such fuel to summer use. It is desirable to keep as cool during the heated term as is consistent with the pecuniary and mechanical means at our command; therefore, we should have our artificial heat so arranged as to be used only when desired for active work, and employed no longer than is necessary, thus we shall escape uncalled for heating of the house, and incidentally avail ourselves of an instrument of economy. Second, we should engage every sanitary means within our reach to maintain good bodily health, and dispense with the imperfect combustion, always maintained where coal is burned confined. Carbonic oxide (a deadly poison) is given off in large quantities from the imperfect combustion of coal; and even though the damper of the stove or furnace be wide open will escape through the cracks, and even through the iron or brick itself, to permeate the surrounding atmosphere. A steak broiled over a coal fire is, nine times in ten, saturated through and through with carbonic oxide.

"It seems unnecessary to delineate the labor of building and maintaining a coal fire, whether it be during hot or cold weather, as all are sufficiently familiar with the proceeding to render the unanimous decision that it is a veritable nuisance. Why not abate it? and employ gas. ********

"So strong is the popular demand for gas as a fuel that the manufacture of gas stoves is fast becoming one of the industries of our country; it needs but the cordial and sympathetic cooperation of the manufacturers of gas to work a common good to all concerned. When the gas stove manufacturer, the gas company, and the people, are hand in hand in their efforts to bring about the use of gas as a fuel, then will we realize what should have existed long since—the economical and effective transportation of light and heat to every house within reach of a gas main. ********"

Gas a Caged Wizard*

BURTON L READ

A Rapidly Growing Utility Industry with Potentialities that Need Encouragement —Gas as a Coal Saver

WITH EQUIPMENT and appliance companies included, capital investment in the manufactured gas industry in the United States is not far from $4,000,000,000. Gas and coke-making are the only economical methods of using bituminous coal, which in raw burning yields only about 5% of its potential energy and leaves in ashes or atmosphere enormously valuable by-products. Yet the bituminous coal used for gas and coke is not more than 4% of the total supply. It is this situation, combined with the inevitable slowness of raising capital and the hampering tendency of most of the current heat standards, that suggests for gas making the description employed in the above title.

Three years ago the industry was estimated by the Calder committee to be short of capital needs by neighboring $500,000,000. Times have improved, and with the building boom of 1923 the companies made a new high record by spending approximately $450,000,000 to expand their plants. Yet many companies are behind actual requirements, incident to present methods of gas utilization. Considering what gas ought to be doing as a true economic fuel for industry and the source of needed by-products, there is evident a theoretical shortage much greater than anything the visible demand indicates.

New Industry Created

It is necessary to keep in mind both the potentialities above noted and the great expansion that the gas industry has already achieved along new lines of usefulness, to get in true perspective such recent occurrences as the overthrow of the 80-cent gas law in New York City, the action of the Colorado Public Utilities Commission in allowing a discretionary heating standard, and the progress in certain western communities of the "three-part rate" for more equitably assessing gas costs on consumers.

The gas light has taken a back seat

*An article which will appear in "The Magazine of Wall Street."

with the rise of electric lighting, but within the last quarter-century the broadening use of gas as a fuel has practically created a new industry. Here is the record since 1900, in approximate figures of gas sold:

	Manufactured Gas (Cubic feet)	Natural Gas (Cubic feet)
1901	101,625,000,000	114,000,000,000
1922	350,000,000,000	763,000,000,000
1923	370,000,000,000 (Estimated)	

Three things are outstanding in this table: (1) the multiplied consumption of both manufactured and natural product, (2) the more rapid gain in natural gas, and (3) the present volume of natural as compared with manufactured. The contrast in the two types of product is still greater with allowance for some 30,000,000 cubic feet of natural gas mixed with manufactured and included with it in the above total.

In spite of the contrast in total output, manufactured gas supplies about 3½ times the number of consumers reached by the natural product. Natural gas is at best but a passing quantity, and the serious problems of the gas industry center about the manufactured article and its vital relation to coal-saving.

Natural Gas Supply Temporary

Natural gas in the above period kept pace with oil output, and in ratio of gain even surpassed it. Much of it has served the fuel needs of the oil industry. Another large quantity goes into casing-head gasoline, and, more extravagantly, to make carbon black. Abundance of the supply in some sections has meant a good deal of waste. The future of natural gas is limited, perhaps to not much more than the middle of the present century. Even now the supply tends to decline, and in Ohio and other sections manufactured gas companies face the problem of serving communities where the natural product is giving out.

While natural gas expanded in pyrotechnical fashion in the above period, the output has shown some rather dizzy fluctuations and the 1922 figure was well below that of 1920. In contrast, the progress of manufactured gas has been steady—on the average about 10 per cent a year.

New Users Are Many

Of the present supply of the manufactured product, considerably less than one-fifth is used for lighting. More than half goes for cooking, water-heating and sundry domestic purposes. Something like one-fourth serves industrial uses, with the ratio growing all the time.

Brass foundries and all types of metallurgical plants are among the great consumers, together with bakeries, candy manufacturers, laundries; a growing list as the gas salesman and the expert engineer join forces to displace coal. "If it's done with heat, you can do it better with gas," is the slogan of the up-to-date company, urged with missionary zeal and backed with such telling arguments as economy, convenience, and uniformity of cost from one year to another. Total output of gas about doubled in the last census decade, while its use for industrial purposes increased about 1000 per cent. Today the rate of gain for industrial use is even greater.

Househeating a Future Problem

Ultimately such an expansion may extend also to househeating. In this field some interesting beginnings have been made but most of the companies still hesitate, owing to the high peak load for a short season without an offsetting demand in summer. But in time this difficulty may be overcome by extensive

use of gas for refrigerating purposes. The up-to-date cooling plants use gas heat for boiling off ammonia after the latter has gone the circuit in its icing functions and has been absorbed into water. Until refrigeration has created a larger summer load, gas men are leaving mostly to the oil-burner the campaign against anthracite for domestic heating. Oil is at present the cheaper fuel, which is another argument for the same position. But in the long run oil cost will be far above present figures, and the gas-makers expect then to deal successfully with that phase of the problem if they want to.

How Gas Saves Coal

Ask the ambitious gas man about the future, and he will tell you that the industry is capable of immensely more benefit to the community. He will declare that virtually everything now done with coal can be done with gas or coke, that by burning coal in the gas retort instead of the furnace there is possible an almost incalculable saving.

Much coal is wasted in handling; more in careless burning. From all that is burned in furnaces, the gas goes into the air without a particle of service and the valuable by-products are lost. One ton of coal will produce in the neighborhood of 10,000 cubic feet of gas; 1000 pounds of salable coke for water gas making or for smokeless fuel; 5 pounds of ammonia and nine gallons of tar with a wide-spreading family of sub-distillates for chemical and medicinal uses. Still further, it is urged that the smoke nuisance created by burning soft coal would be banished, barring railroad use, by a wide enough utilizing of gas and coke. This item alone involves a large economic saving in public health, in the life of steel structures and interior finish, and in many other ways.

Relation to Electricity

Thus the two great divisions of the public utility field, electricity and gas, have more in common than a wide prevalence of joint ownership. Both are huge potential coal-savers. This means numerous problems in the harmonious future development of the two agencies. Electricity can serve numerous purposes for coal-saving where gas cannot reach, as for motive power of railroads. In other ways the two can cooperate and supplement each other, as in joint operation at the mouth of coal mines, the gas plant supplying fuel to the electric.

But to forecast readily a steady further expansion of gas utilizing would be perilous. Gas is a manufacturing industry. It must not only look to its supply of raw materials, but must be sure that from the materials available it can produce the quality of product required by law and by doing it can earn a living wage. Here is the vital problem of standards.

The Raw Material Problem

Some 30 per cent of the manufactured gas used in the United States is coal gas —that is, it is made in retorts from bituminous coal. The balance is mostly carburetted water gas. This is made by forcing steam through heated coke or anthracite coal, making a gas that is far below all standards of heating content, but is brought up to par by enriching with oil. Frequently coal gas and water gas are mixed. The two types of plants are worked most economically together, the coal-gas retort supplying coke for water gas.

Straight coal gas gives a good heating value, but to meet legal standards special varieties of coal are required, and occasionally enrichment is necessary, either with oil or by mixing with

carburetted water gas already so enriched. Bituminous coal for gas-making is abundant, subject only to the influence of legal heating standards in forcing the use of coal from distant points when nearby coal would give adequate service. For a single example, Illinois has large coal supplies and the average haulage of coal consumed in the state is 170 miles. Yet its gas coal comes an average distance of 400 miles from Kentucky.

Oil Supply Not Permanent

Ample bituminous coal means an assured provision of material for coal gas manufacture and of coke for water gas. Anthracite coal is used largely for water gas, but obviously it is not a resource for any great length of time.

Now arrives the real problem,—oil. Gas oil is a slim reliance, for two reasons. One is the short lease of life which experts give to practically the entire supply of petroleum in the United States; say twenty-five years. And a second is the gasoline engine. In earlier days, gas oil was abundant and cheap. With the rise of the automobile and motor-truck and the cracking process for extracting gasoline, the fraction available for gas-making became inferior and costly. The abnormal gasoline demand of the war period gave the oil question an extra twist; deflation brought relief. But regardless of all temporary influence, the fact remains that oil for bringing gas to present heating standards can be had for only a limited period.

Mixed Gas Logical Solution

Considering the higher heat value of coal gas compared with uncarburetted water gas, and the obvious utility of operating coal gas and water gas plants together with the first supplying coke to the second, all of this points to an eventual solution of the problem by mixing the two products. Gas men say this would produce a quality that, although well below present standards, would give excellent service. Similar results are promised by the new method of steaming the coke from coal gas while still in the retort, and another possibility of the future is the oxygen process for complete gasification of the coal, giving six or seven times the present volume of gas though virtually eliminating by-products.

But gas supplied by these methods, though adequate to actual needs, would not meet present legal tests. The economical development of the gas industry within the next two or three decades will largely hinge on this question of standards.

The gas industry has recently come through one struggle over standards, only to be faced with another. Candle-power tests were belatedly displaced by heating content when gas became obviously a heating instead of a lighting agent, even when supplied for lighting purposes to Welsbach burners. But instead of experimenting to get the right level of a heating standard, the commissions played safe by applying a heating test to gas of the old candle-power standard and using the result for a heating requirement. The two qualities have no real relation.

Heat Content Still a Problem

Standards fixed by this method around 600-650 British thermal units proved quickly to be too high, the engineers finding that, owing to a large proportion of condensible hydro-carbons, tending to clog the distributing system, lowering of standards would mean an actually better service to the consumer. Once more the companies went to work on the commissions, and by a gradual process standards have been scaled to a general average of about 550-560 B.t.u. In various states standards have come down to a range

of 500-525, and for New York City the struggle between a legislative figure of 650 and one of 537½ fixed by the Public Service Commission is now in the courts.

But with all concessions the problems of standards remains for further consideration as time goes on. The general level indicated above is roughly 9% over the average for leading British companies, and compares with a standard of 450 B.t.u. for all parts of Canada. Uneconomical carrying of coal over long distances is a fault of present rules in some regions, but the defect of these tests, which is most deep-steated and menacing is due to the oil problem.

Elasticity of Standards

The gas man declares that elasticity of standards must come if the industry is to serve its logical function. He points with pride to the action of the Colorado commission in leaving to the company the right to fix whatever standards they find suited to local conditions, and urges that exact B.t.u. content of the gas is far less important to the consumer than uniformity of quality and pressure.

With still more emphasis he sets forth that standards and profits are unrelated. The company is allowed to make only a fair return on its investment. If a lower standard means lower cost, which is never the case in direct proportion, then the commission will of course lower the rate if the former price was a fair one. It is not to make more money on a cubic foot of gas that the companies are aiming, but to keep on doing business and to expand with the growing needs of their communities.

The "Three-Part Rate"

The rate problem is important, but is a question of system rather than absolute level. The flat rate, such as $1.50 per thousand feet, is unscientific and inequitable. Barring the miscalled "service charge" which some companies are permitted, the flat rate means that many small consumers are served at a loss. Moreover, the company collects the same rate from Jones, who uses his peak demand only once a month, as it does from Brown, who uses it several times a week. Yet in all equitable reckoning it costs as much to be ready to supply Jones as it does in the case of Brown.

Hence the "three-part rate," in which the Doherty properties are pioneers. It consists of a customer charge based on accounting and other operating costs which are practically uniform for all customers; a readiness-to-serve charge based on the customer's maximum demand as determined by his burners and the size of the meter required; and then a flat rate per thousand for gas actually consumed. It looks like a large bill until you get to the charge per thousand, which may be half or less of the previous flat rate.

Financing Problems

So closely is a large portion of the gas industry intertwined with the electrical and traction in financial and operating relationships that it is difficult to discuss the financing of gas companies apart from the problems that are common to all local utilities. In its capacity for obtaining funds the gas division in late years has fallen about midway between the electric and traction groups. This is largely a reflection of war influence, which bore least severely on the electrical division and affected gas with some severity, but in very few cases with disaster. The manner in which gas companies stood the test of war conditions is in itself an impressive argument for the strength of the industry.

Securities Rank High

From all the facts above reviewed bearing on the growth, the vital services and the expansive outlook of the gas industry, it follows without argument that gas company securities rank with the best of public utility issues in solidity and stable value. It is necessary that these facts should be known to investors, to whom an increasing offering of securities for the further development of the gas utility is certain.

For much of the necessary development work money has been provided through the general financing operations of interests holding a diversity of utilities, with electricity usually dominating. Companies operated independently have been able to meet pressing needs as a rule, but it is recognized that growing demands upon the industry will call for a larger scale of financing as time goes on.

Far-Sighted Policy Needed

Regulating policies of the commissions are generally equitable, and the attitude of the courts has been so plainly expressed that no company need fear confiscatory rate action, either state or local. The question for the future is mainly one of elasticity. Assurance of compensatory rates leaves something to be desired in opportunity to meet situations and to make adjustments in both product and rates necessary for the fullest development.

From the financial standpoint this problem comes most obviously into view when attention is given to junior financing. Largely assisted by customer ownership, utilities have taken a long way the lead of the railroads in stock issues needed to back up bond financing. But much remains for accomplishment, and in the gas field a far-sighted policy of regulating commissions toward standards as well as rates will be one of the factors essential to success.

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In Memoriam

Brayton R. Clark, Vice-President, Malone Light & Power Co., Malone, N. Y.

William W. Randolph, Consulting Engineer,

C. H. Stone, Laboratory Director, Rochester Gas & Electric Corp., Rochester, N. Y.

William Raynor, Secretary, New York & Queens Gas Co., Flushing, N. Y.

Better Public Service

DISCUSSING "BETTER PUBLIC SERVICE" at the annual rally of the Baltimore Gas and Electric Association, in the Maryland Casualty Club House, Herbert A. Wagner, president of the Consolidated Gas, Electric Light and Power Company, said in part:

"We have talked 'Good Public Service' and advertised it for a long time until we all have formed some idea of what it means. But is our service so good in every particular that it cannot be made better? We cannot say that as yet. So, for our discussion I will change the theme to 'Better Public Service,' for that is what we should ever have in mind.

"You know the aim of any management is to give the best service to the people that it is possible to give. But however strong this aim may be, it cannot be accomplished without the wholehearted assistance of every one in the employ of the company. It cannot be carried through by a few; it cannot be done by organization or by rules, or even by improved methods. Cooperation and team-play are important factors, but real success depends upon the individual effort of everyone in the organization. So it is the personal element in 'Better Public Service' that I want to stress.

"'Good Public Service' or 'Better Public Service' is not a definite thing, or one that can be described in a few words or can be produced by formula. Good service goes far beyond the supplying of good gas and reliable electricity; it is really a personal thing, an attitude of mind, a habit of action, with all of us who can contribute to this service.

"Why are we all working? To make a living, you will probably say. Yes, but what are we living for? Aren't we living to progress and make our lives count for something?

"The surest way to progress is to be useful, and we make our lives useful by serving others. The better we serve the more our service is worth. This is why the expression 'Better Public Service' should mean something very personal to each of us. Our friends and associates judge us by our service to others; our willingness to serve, our desire to help. That is the only way in which we can grow or progress or be happy.

"What do you want people to think of your company? Isn't it your job to sell the company to the public—to make friends of the people? You can only make friends by giving good service in every way you know how.

"Good service means unfailing courtesy and patient attention to every inquiry or request made of us, and the greatest care in the performance of every duty which may in any way affect a customer. It requires constant vigilance that no act or omission may lead to a misunderstanding of the company's desire to be just and fair and kindly to everyone.

"How is the company rated by the people you know, the people you meet and the people who see you at work? Sometimes, but not often, I am glad to say, we get letters or notices to the effect that some of our men are not doing good work or are loafing on the job. Who gets the blame for such inefficiency and bad service? The company, of course, because, to the people, the employees represent the company.

"What sort of a reputation are you earning for the company? Some years ago I remember reading Frank Stockton's delightful story, 'Rudder Grange.'

Some unusual people rented a small farm, and one day the man of the house heard their watch dog, Lord Edward, barking ferociously down the lane. Upon investigating the cause of the disturbance he discovered a tramp seeking safety first in an apple tree. The tramp called out to him, 'Say, Mister, chain that there dorg and I'll fix things so that you won't never be bothered by no more tramps.' It was a bargain. The next day the man noticed a very curious mark cut on a tree at the entrance of the lane. To the surprise of the household no more tramps came their way that summer. Some weeks afterward the man saw a tramp looking at this mark on the tree, and he bribed the hobo to tell him what it meant. He learned that he had been branded as a 'mean stingy cuss with a wicked dog, and there ain't no use going there.'

"So every business has its mark—that those who know the signs may read. It is the mark that is given to it by its employees. If you think well of the company be sure that the mark you make for it is good one."

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To the Members of the Association

Your Committee on Cast Iron Pipe Standard desires to know the experience to date of each Company that has used the No. 2 (formerly "B") Bell for Cast Iron Pipe. This experience, brought up to March 1, 1924, should be sent to me on the form indicated below.

WALTON FORSTALL, *Chairman.*

EXPERIENCE WITH NO. 2 BELL FOR CAST IRON PIPE.

Name of Company .....

Size of pipe .....Length of line.....Kind of joint.....

Date Laid .....No. of leaking joints to date.....

Remarks .....

(The above record should include every line laid with the No. 2 Bell.)

Some Ads of the Michigan Committee

It Is the Truth

THE FOLLOWING is an excerpt from an article on "The Progress in the Science of Gas Making," published in the August 16, 1876, issue of the American Gas Light Journal.

"We do not hesitate to use the term 'Science of Gas Making,' because the fact is becoming every day more and more prominent, that wherever the business is conducted without regard to the scientific principles involved, it is becoming more and more unsatisfactory. These are searching times. Times when every man is asking in a most serious manner 'why is this thus?' Perhaps there is no outpost of household expenses that the march of retrenchment is more likely to come in contact with than that of the gas bill. It is an account rendered of the coming in and the going out of an invisible yet all-pervading element in the daily comfort and safety of the whole family. The gas burner is the first sentry to challenge as one enters the house, and to see it carefully extinguished is the last duty at night."

Nearly 50 years have elapsed since that article was written. Surely the author and the editors of the paper in which it appeared were visionaries, for today, as all men know, the gas industry stands well up in the list of highly developed scientific industries.

But it cannot stop here. Just as "the holder must not go down," has been adopted as one of the industry's slogans, so must they adopt the first line of the famous hymn, "Forward, be our watchword," as another battle cry.

MANUFACTURERS SECTION

G. W. PARKER, Chairman — E. E. BASQUIN, Vice-Chairman

C. W. BERGHORN, Jr., Secretary

MANAGING COMMITTEE—1924

AARON, C. T., Boston, Mass.
ABBOTT, M. E., Taunton, Mass. (Gas Sales of N. E.)
BARTLETT, C. E., Philadelphia, Pa. (New Jersey)
CRANE, W. M., New York, N. Y.
DuHART, J. S., Jr., Newark, N. J.
FAIRCHILD, S. E., Jr., Ambler, Pa.
FOWLER, W. M., Philadelphia, Pa.
GRADY, S., Philadelphia, Pa. (Pennsylvania)
GREENE, J. J., New York, N. Y.
HOBBS, G., Toronto, Ont., Canada. (Canadian)
KING, T., Pittsburgh, Pa.
McCULLOUGH, CHARLES, Milwaukee, Wis. (Wisconsin)
McDONALD, DONALD, New York, N. Y.
McILHENNY, J. D., Jr., Philadelphia, Pa.
NORMAN, E. A., New York, N. Y.
NORTON, ARTHUR E., Boston, Mass. (N. E. Gas Eng.)
PARKER, JOHN F., Rockford, Ill. (Indiana)
RAMSBURG, C. J., Pittsburgh, Pa.
ROPER, G. D., Rockford, Ill. (Illinois and Iowa)
SEIDENGLANZ, C. H., Pittsburgh, Pa. (Southwestern)
SMITH, W. L., Battle Creek, Mich. (Michigan)
STITES, TOWNSEND, Gloucester, N. J.
STOCKSTROM, A., St. Louis, Mo. (Missouri)
WHETSTONE, W., Philadelphia, Pa.
WILSON, H. A., Newark, N. J.
WOLFE, A. McW., Baltimore, Md. (Southern)

CHAIRMEN OF SECTIONAL COMMITTEES ORGANIZED TO DATE

Exhibition—GEO. W. PARKER, St. Louis, Mo.

Nominating—F. A. LEMKE, Kalamazoo, Mich.

Division of Accessories Manufacturers—H. A. WILSON, Newark, N. J.

Division of Apparatus & Works Manufacturers—S. F. FAIRCHILD, Ambler, Pa.

Division of Gas Range Manufacturers—CHAS. T. ARON, Boston, Mass.

Division of Heating Appliance Manufacturers—THOMSON KING, Pittsburgh, Pa.

Division of Industrial Appliance Manufacturers—WALTER WHETSTONE, Philadelphia, Pa.

Division of Lighting Appliance Manufacturers—TOWNSEND STITES, Gloucester, N. J.

Division of Meter Manufacturers—J. D. McILHENNY, Jr., Philadelphia, Pa.

Division of Office Labor Saving Devices—E. A. NORMAN, New York, N. Y.

Division of Water Heater Manufacturers—W. M. FOWLER, Philadelphia, Pa.

Division of Supply Manufacturers—J. J. GREENE, New York, N. Y.

The Expressed Policy of One Manufacturer Company

WE QUOTE BELOW from the bulletin of one manufacturer who expresses himself in no uncertain terms as to "Quality Merchandise."

"We have no tolerance for the manufacturer of second-rate accessories. Our view is that there is no middle ground; either an appliance is quality throughout or it is mediocre. We will not handle any but the highest grade equipment—products that are the result of the ingenuity, experience, and high standard of ethics of the seasoned manufacturer of gas appliances.

"Fortunately there are many manufacturers of such equipment—men who who have some ideals in connection with their business; who will not tolerate poor workmanship nor materials; and who spend large sums annually in the perfection of gas appliances.

"But, unhappily, there are also manufacturers whose only interest is in the profit to be made from their product. They have no real conception of what is required of an appliance and they care less. These manufacturers should not be encouraged to carry on their business, for they are materially affecting the standing of the gas fraternity and discrediting the gas appliance industry as a whole.

"We cannot stress too strongly the necessity of all those engaged in the marketing of gas equipment to insist upon the best. Both manufacturers and dealers will find that in the end the surest profits result from the sale of appliances where quality dominates. It is only through such sales that a permanent, substantial business can be built."

The Manufacturers Section Officers

Geo. W. Parker

MR. GEORGE W. PARKER, the new chairman of the Manufacturers' Section, was born in St. Louis, Missouri, June 15, 1878. His early education was secured in the grammar schools of that city and the manual training school, after which he entered Washington University, graduating from that institution.

Mr. Parker affiliated himself in 1900 with the Parker-Russell Company of St. Louis, his home city, where he has always lived with the exception of the seven years from 1903 to 1910, during which time he was located in New York City. In 1915 Mr. Parker left this company to go with the Russell Engineering Company, also of St. Louis, becoming vice-president and general manager of that firm. In November of last year he severed his connection with this company to return to the Parker-Russell Company as vice-president and general manager.

Mr. Parker has always been active in Association affairs and in addition is a member of several of the state and district gas associations. He is also a member of the Missouri Athletic Association and the Rotary Club of St. Louis and claims as his particular hobby "owning a farm" which means, in his case, the practical working of it in his spare time.

E. E. Basquin

Mr. Eugene E. Basquin, the vice-chairman of the section, was born in France in 1876. He came to this country when but seven years of age and received his education in both public and private schools.

In 1898 he entered the designing department of the Taft-Pierce Manufacturing Company, Woonsocket, R. I., one of the largest special machine and tool contract manufacturers in the country. He was made an executive of this company in 1903 and remained with them until 1912. At this time he resigned and came to New York City where he assisted in the reorganization of R. Hoe & Company, the large manufacturers of printing presses.

Mr. Basquin soon after, in 1916, accepted the position of vice-president and general manager of the Surface Combustion Company, New York, N. Y., which position he now holds.

He has always been most interested in all activities relative to business and civic life, and can boast of serving with the first Rhode Island Regiment of Volunteers during the Spanish-American war. He states, "My life up to the present time has neither been startling or eventful," and ends his letter by admitting to be a married man.

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Keeping Faith with the Gas Industry

C. B. BABCOCK

THE BEST FUEL known for both domestic and industrial uses is gas—either the natural product or that manufactured from oil or coal.

Through more than a century of use and abuse (and sometimes defamation) gas has demonstrated its greatest efficiency, and through sheer merit has won recognition as a completely satisfactory fuel *when burned in the right equipment.*

It is convenient to use, available at the touch of a match or the press of a button; it is clean and healthful, and in the proper appliances is free from all odor; it does not require storage space nor the transportation facilities of coal; does not have to be paid for in advance, and is decidedly economical. While solid fuel of any kind is at least 50 per cent wasteful, gas is the very essence of heat. The loss incident to the use of dirty solid fuel has cost the civilized cities of the world untold millions, and the saving effected by the substitution of gas—whose waste products are negligible—has been enormous.

The average price of gas in the United States and Canada is now so low that from an economy standpoint there can be no valid objection to its use. From a utility standpoint, the development of practical gas appliances has raised the efficiency of gas to a point unapproached by any other fuel.

But much of this efficiency is conditional upon the use of quality appliances. Gas is greatly handicapped and brought into disrepute by the sale of inferior equipment. Manufacturers and dealers who sell any but the best are not keeping faith with their customers nor with the gas industry.

Trustees Gas Educational Fund Taken Over by A. G. A.

In accordance with a resolution of the Executive Board, adopted in the fall of 1923, the Treasurer has accepted the cash and securities of the Trustees Gas Educational Fund, depositing the same to a special account known as "American Gas Association—Educational Fund." This fund is to be used solely for the education of gas company employees.

INDUSTRIAL GAS SECTION

H. H. CLARK, Chairman — H. O. LOEBELL, Vice-Chairman

C. W. BERGHORN, Jr., Secretary

MANAGING COMMITTEE—1924

ALLINGTON, J. B., Rochester, N. Y.
ANDREW, H. O., New York, N. Y.
BROUGHTON, H. E., Jackson, Mich. (Michigan)
CAULEY, F. F., Chicago, Ill.
CLARK, H. H., Chicago, Ill. (Illinois)
CRAWFORD, H. M., San Francisco, Cal.
DE CORIOLIS, E. G., Boston, Mass.
GALBRAITH, L. F., Oakland, Cal. (Pacific Coast)
HARDING, D. J., York, Pa. (Pennsylvania)
HENRY, H. M., Pittsburgh, Pa.
HEPBURN, W. M., New York, N. Y.
HOLMAN, H. B., St. Louis, Mo.
KELLY, T. J., Fort Wayne, Ind. (Indiana)
KRAUSER, C. O., Baltimore, Md.
LAFORE, P. J., Boston, Mass.
LEHNROTH, J. P., Newark, N. J.
OSTERMAN, P. C., Elizabeth, N. J.
QUINN, J. J., Quincy, Mass. (N. E. Gas Eng.)
RAMSAY, R. E., Philadelphia, Pa.
RASCH, W. T., New York, N. Y.
SCHUETZ, A. A., Milwaukee, Wis. (Wisconsin)
SELLMAN, N. T., New York, N. Y.
SLIMPIN, C. D., Montreal, Can. (Canadian)
STAHL, C. R., Davenport, Ia. (Iowa)
STEPHANY, E. J., Pittsburgh, Pa.
THOMPSON, W. D., Hammond, Ind.
VITTINGHOFF, H., Boston, Mass.
WATSON, H. E. G., Toronto, Can.
YEATON, G. D., Providence, R. I. (Gas Sales of N. E.)
YOUNG, A. W., Knoxville, Tenn. (Southern)
YOUNG, R. R., Newark, N. J. (New Jersey)

CHAIRMEN OF SECTIONAL COMMITTEES ORGANIZED TO DATE

Convention Program—F. F. CAULEY, Chicago, Ill.
Cooperation with "Industrial Gas"—N. T. SELLMAN, New York, N. Y.
Educational—R. R. YOUNG, Newark, N. J.
Industrial Booklets—
Combustion—H. O. LOEBELL, New York, N. Y.
Hotel & Restaurant Uses—J. P. LEHNROTH, Newark, N. J.
House Heating—E. D. MILENER, Baltimore, Md.
Large Volume Water Heating—W. T. RASCH, New York, N. Y.
Steam Boilers—H. VITTINGHOFF, Boston, Mass.
Wholesale Baking—H. M. HENRY, Pittsburgh, Pa.
1000 Uses for Gas—H. H. CLARK, Chicago, Ill.
Ceramics—C. C. KRAUSS, Baltimore, Md.
Drying—J. ZANDOR, Chicago, Ill.
Food Products—E. J. STEPHANY, Pittsburgh, Pa.
Forging & Heat Treating—W. D. THOMPSON, Hammond, Ind.
Soft Metal Melting—W. M. HEPBURN, New York, N. Y.
Tank Heating—OSCAR BOWEN, Chicago, Ill.
Nominating—F. F. CAULEY, Chicago, Ill.

The Process of Enameling with Industrial Gas*

ROWLAND MANLY, Industrial Gas Sales Engineer, The Peoples Gas Light & Coke Co., Chicago, Ill.

VITREOUS OR PORCELAIN enameling is the process coating the surface of iron or steel with glass. Liquid enamels having a varnish or oil base (procurable in all paint shops), and applied to surfaces with a brush are in no sense real enamels. Paint manufacturers have adopted the word enamel for their products simply because there is some slight resemblance between the apparent effects that may be produced and real genuine porcelain or vitreous enamel. Considerable confusion prevails among the public as well as the trades relative to this identity in nomenclature. Many manufacturers of japanned merchandise take the liberty of describing their goods as being enameled when in reality they are simply dipped in a vat of paint and hung up in a japanning oven to dry. No difficulty need be experienced in detecting real enameled ware from the painted article. The surface of vitreous or porcelain enameled iron or steel is glass hard, is not affected by ordinary acids, may readily be cleaned, will not discolor or fade and among many other desirable features, is a permanent coating and absolutely sanitary.

*Reprinted from the "Peoples Gas Club News."

A recent installation of industrial gas in a large Chicago factory is described in detail expressly for the purpose of illustrating the many advantages, both financial and scientific, that accompany industrial gas. An interesting feature of this description is the logical "step-by-step" method employed and the value of thorough investigation and analysis. After all the deductions have been made and have been made upon a strictly unprejudiced basis, the final conclusion well demonstrates that industrial gas is the one and only fuel for this work.

A Brief Description

Steel sheets are generally well lubricated with a thick grease before being stamped into the desired shapes. This is to overcome excessive friction between the die and the steel and also to prolong the life of the die. The grease must then be throughly washed off. Therefore the newly stamped stampings are boiled in an alkali solution. From this solution they are transferred into a rinsing tank of pure water and from there into a "pickling" tank of weak hydrochloric acid. The function of the acid is to remove every trace of the grease and alkali that might still be present and, far more important, to leave an absolutely clean and clear porous surface. All traces of the acid are removed in another pure water rinsing tank. The steel is now ready for the first application of the enamel. The solution and rinsing tanks transform as if by magic the dirty, greasy, rusty surfaces of the steel stampings into uniform surfaces of beautiful grey steel.

What Enamel Is

The enamel is now sprayed on to the surface of the steel. The enamel is a finely powdered substance composed of a variety of materials. Silicon, boron, quartz, manganese, cobalt, iron oluminum and felspar are a few of the many elements and compounds used. The formula must be such that when the enamel is fused it will adhere and have the same coefficient of expansion as the iron or steel it coats. The colors are produced by the addition of various metallic oxides. In the case of sheet steel, the enamel powder is mixed with water and sprayed on to the surfaces. For cast iron it is simply dusted on to the surfaces. Occasionally the enameling powder is mixed with clay as well as water. The function of the clay is to act as a coagulating agent.

A Glass Coating

After the steel stampings coated with the unfused enamel have been thoroughly dried in the open atmosphere a batch is carefully placed by hand on a traveling bed that is mechanically slid into a huge gas-fired oven. The temperature of the oven is maintained at 1700° F. The atmosphere within the oven is chemically the same as the air we breathe. The steel and enamel soon reach the oven temperature and the two fuse together, the enamel becoming a glass securely adhering to the steel. This operation takes but a few moments. The stampings are removed and the entire process of spraying with another coat of a slightly different formula and then fusing is repeated a second and third time. The process is now completed; an ideal finish for thousands of household and commercial articles.

Cast iron enameling is accomplished in practically the same manner as steel. The essential differences being that the iron is cleaned by means of sandblasting instead of solutions; heated to the necessary temperature before the application

of the enamel; and the enamel is dusted on in a dry form rather than being sprayed on in a liquid form such as the steel process.

Gas, The Better Fuel

In passing it may be of interest to speak of the furnace itself. The design must meet the two requirements imperative to successful enameling: 1st, absolute uniform temperature; 2nd, a constantly maintained pure atmosphere. All the other qualifications of good furnace design must, of course, be respected but enameling is impossible unless the atmosphere is pure, free from products of combustion, unburned fuel or soot. Temperatures too high or too low are absolutely valueless. The lining of the gas-fired enameling oven is of a high grade refractory brick. Between this and the outside is eighteen inches of insulating brick. The outside is of sheet steel, the whole being held together by means of structural steel. There is no muffle in a gas-fired enameling oven. These expensive muffles are used only in "crude" fuel enameling ovens. The naked hand which may be comfortably placed on any part of the exterior wall of the oven, when it is in full operation, well demonstrates the almost perfect insulation value of this type of construction. One may stand on top of the furnace and during cold weather become thoroughly chilled unless ordinary space heating equipment is provided.

Labor Saving

The burners are located in batteries along the sides of the furnace and just below the level of the traveling bed. An automatic recording thermometer enables the enamelers to maintain constant temperatures without experiencing any delay. Gas is delivered at the burner at a pressure of six to ten pounds.

The large 4 ft. x 10 ft. gas-fired oven is shut down at noon every Saturday. When the enamelers return Monday morning the temperature has dropped so very little that it takes but 45 minutes to bring it up to the desired point. In former practice, where coal was used and the ovens were shut down at noon Saturday, it was necessary for the firemen to return Sunday afternoon at 5:00 in order to get the oven up to the proper temperature in time for work Monday morning.

This incident just related, however interesting, in no way illustrates the real advantages and economics of industrial gas. The superiority of the finished product, the elimination of production losses, the savings in labor and floor space, and the reduction of "overhead" expenses are a few of the features made possible only with industrial gas.

Tabulated below are the figures obtained by running two weeks on gas and three weeks on coal with the same men, on same class of goods, mostly sheet steel stove work, ground coats, first and second white coats, at same temperatures, about 1700° W., in furnaces of same size and extended to a year's basis. The gas furnace has a standard 4 ft. x 10 ft. working chamber, intermittent type, open furnace, without muffle. Coal furnace of standard 4 ft. x 10 ft. working chamber, coal fired, using full carborundum muffle.

COMPARISON OF FURNACE COSTS

Fuel

One hundred and thirty pounds of coal per hour at $8.05 per ton unloaded at plant. 1640 cubic feet of gas per hour at 72¢ per thousand cubic feet.

Coal	Gas
$0.53	$1.18

Power

Gas compression expense (power, water, labor).

Coal	Gas
.00	.10

Labor

Wheeling coal to furnaces, firing coal, cleaning fires, removal of ashes, occasional rehandling of coal from pile to bins.

Coal	Gas
.47	.00

Furnace

Repairs, maintenance on furnace, muffle, fire box and flues, $480 per year including labor, material and supervision. Gas furnace, compressor and auxiliary equipment.

Coal	Gas
.07	.02

Loss of Production

Loss of thirty days per year due to furnace shut down for repairs; 332 square feet per hour at 5¢ per coat.

Coal	Gas
1.50	0.00

Overhead Expense

Interest and taxes on space in building used for coal storage; 1650 square feet at $1.00 per square foot per year. Interest, depreciation and taxes on gas furnaces and auxiliary equipment.

Coal	Gas
.37	.14

Miscellaneous

Time of purchasing department ordering coal. Interest and depreciation on coal in storage. Smoke prevention expense. Coal and ash dust expense, etc.

Coal	Gas
.40	.00

Special

Service of Consulting Engineers such as furnished by The Peoples Gas Light & Coke Company without charge to customers.

Coal	Gas
.20	.00

Advantages in Finish

Superior color and gloss on gas-fired ware, figured as reduction of 50¢ each in selling expense of finished stove, or figured that a gas-fired finished stove will bring 50¢ more in price.

Coal	Gas
1.40	.00

Total Cost per Hour

Coal	Gas
4.94	1.44

Average Hourly Production of Square Feet of Enameled Ware

By Coal	By Gas
332	425

Total Cost per 100 Square feet of Enameled Ware

By Coal	By Gas
$1.50	$0.34

Enameling steel or iron with industrial gas at a total cost of thirty-four cents per hundred square feet of surface represents a saving of nearly 350 per cent over and above the cost of enameling with coal. Of course, the furnace is of considerable importance but it must be pointed out that should the fuel and furnace costs be left out of consideration there is a still more astonishing comparison illustrating the economy of gas. It is the inherent qualities and possibilities of gas that affects these tremendous economies.

Ideal Installation

The building of all furnaces, laying of piping and the setting of all the equipment necessary for the handling of the gas was under the direct supervision of Rowland Manly, L. M. Menne and Nicholas Olker (West Shop). This is undoubtedly one of the most perfect installations of gas-burning equipment to be found anywhere. The piping is overhead and out of the way. The largest

battery of cast iron meters in Chicago is located in an overhead balcony. A casual inspection and a visual comparison is sufficient to illustrate the value of industrial gas over "crude fuels."

In addition to the work and efforts of the gas company, it is pleasing to mention the very congenial relations that existed at all times with the personnel of this manufacturer. Every courtesy and convenience was extended. The advice of Robert Long and Herman Tech, enamelers, was very valuable. The work of Robert Burns in laying brick was of the best. From the beginning to end no effort was spared in making the installation ideal. The gas company certainly appreciates the attitude that prevailed at all times.

Self Inspection Blanks for Gas Plants

At the 1923 Convention the Insurance Committee submitted a form of self inspection blank for gas plants which will be published in the Accounting Section Proceedings. Additional pamphlet copies of the inspection blanks will be struck off and will be available for our members on or about March 15.

These blanks should be of value particularly to the smaller gas plants that may not enjoy the inspection service provided by some of the larger insurance companies.

In order that we may know how many copies of the self inspection blanks will be required, orders for these blanks should be sent promptly to the secretary of the Accounting Section at Association Headquarters.

The blank is intended for a weekly or monthly report by foreman so that approximately fifty-two copies will be required for the year's inspection. These will be made available to members at their cost of printing.

Hardening Lock Washers

Hardening lock washers stamped from steel strips or cut from helical coils of wire.

Washers are heated to 1,550° F. and quenched in oil. Furnace in operation 23 hours per day.

Gas per month	400,400,000 B.t.u.'s
Gas per day	15,235,000 B.t.u.'s
Gas per hour	671,000 B.t.u.'s
Gas per 1,000 lbs. of washers	4,862,000 B.t.u.'s

COMMERCIAL SECTION

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LOUIS STOTZ, Secretary

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Home Service—ADA BESSIE SWANN, Newark, N. J.
Salesman's Manual—H. D. VALENTINE, Chicago, Ill.
Sales Stimulation—J. P. HANLAN, Newark, N. J.

Are You Interested in a 50% Increase in Gas Sales for Your Company?

LOUIS STOTZ, Secretary, Commercial Section

THE SALES STIMULATION program of the Commercial Section has been planned with the following definite objective in view,—

1. That every gas customer shall become a profitable account for the company.

2. The development of every available outlet for the use of gas.

3. A 50% increase in gas sales in the next three years.

Set your objective as something worth while and then give the plan enthusiastic support. There are many men in the gas business who believe the three objects named above are possible of accomplishment and are willing to back it to the limit. They and their companies are going to cash in.

Do you know that the "Save the Surface and You Save All" campaign of the paint and varnish industry was predicated upon the definite objective of doubling the paint and varnish business in five years and that this has actually been accomplished within a period of three years? That is the spirit we want to see back of our hopes for a 50% increase in gas sales in three years.

Look at the following chart,—it shows that it took seven years to secure a 50% increase in gas sales. That is not going ahead fast enough, we must speed up.

	Sales of Gas	Consumption per capita
1916	231,381,313,000	2308
1917	264,493,003,000	2604
1918	271,593,141,000	2638
1919	306,632,786,000	2939
1920	319,888,000,000	3026
1921	326,950,900,000	3053
1922	350,000,000,000	3181
*1923	370,000,000,000	3316

*Estimated

How can this self-set objective be reached? By every company following the national program of sales activities which will be set up in this new monthly sales service.

Every gas company should tie in with this program and arrange to place the service in the hands of every one who is concerned with the development of business, the sales manager, shop superintendent, the company's accountant, district managers, even the salesmen. These are the men who will find the suggestions in this service most helpful.

And then the manufacturers' representatives, the men who come in contact with the sales managers of gas companies, and who are called upon to assist the sales manager in planning his sales activities. By having this service the manufacturer's representative is certainly better able to help his customer, the gas company.

The plan has met with a most gratifying response from our membership as witness of which we publish the following list of subscribers. The plan will not become operative, however, until we have 1500 subscriptions underwritten and we ask that those companies that have not yet subscribed do so at once and others who have already entered subscriptions for one or two sets consider whether they cannot use more.

Subscribers to New Merchandising Service

GAS COMPANIES

Company	*City*	*State*
Adirondack Power & Light Corporation	Schenectady	N. Y.
Alabama Power Company	Birmingham	Ala.
Albion Gas Light Co.	Albion	Mich.
Allentown-Bethlehem Gas Company	Allentown	Pa.
Alton Gas & Electric Company	Alton	Ill.
Amherst Gas Company	Amherst	Mass.
Athens Gas Light & Fuel Company	Athens	Ga.
Athol Gas & Electric Company	Athol	Mass.
Atlantic City Gas Company	Atlantic City	N. J.
Bangor Gas Light Company	Bangor	Me.
Bangor Gas Company	Bangor	Pa.
Beloit Water, Gas & Electric Company	Beloit	Wis.
Binghamton Gas Works	Binghamton	N. Y.
Boise Gas Light & Coke Company	Boise	Idaho
Boston Consolidated Gas Company	Boston	Mass.
Bridgeport Gas Light Company, The	Bridgeport	Conn.
Bridgeton Gas Light Company, The	Bridgeton	N. J.
Bristol Gas & Electric Company	Bristol	Tenn.
British Columbia Electric Railway Co., Ltd.	Vancouver	B. C.
Brockton Gas Light Co.	Brockton	Mass.
Brooklyn Union Gas Company, The	Brooklyn	N. Y.

Company	*City*	*State*
Bucks County Public Service Company	Burlington	Vt.
Burlington Gas Light Company	Newtown	Pa.
Burlington Light & Power Company	Burlington	Iowa
Byllesby Engineering & Management Corp.	Chicago	Ill.
Calumet Gas & Coke Company	Calumet	Mich.
Cambridge Gas-Light Company	Cambridge	Mass.
Carolina Power & Light Company	Raleigh	N. C.
Cedar Rapids Gas Company	Cedar Rapids	Iowa
Central Hudson Gas & Electric Company	Poughkeepsie	N. Y.
Central Indiana Gas Company	Muncie	Ind.
Central Illinois Light Company	Peoria	Ill.
Central Maine Power Company	Augusta	Me.
Charles City Gas Co.	Charles City	Iowa
Charlestown Gas & Electric Company	Charlestown	Mass.
Chattanooga Gas Company	Chattanooga	Tenn.
Chuctanunda Gas Light Company	Amsterdam	N. Y.
Citizens Gas & Electric Company	Council Bluffs	Iowa
Citizens Gas & Fuel Company	Terre Haute	Ind.
Citizens Gas Light Company	Quincy	Mass.
City Gas Company	Marquette	Mich.
City of Norwich Gas & Electric Dept.	Norwich	Conn.
Coast Counties Gas & Electric Company	San Francisco	Calif.
Cohoes Power & Light Corporation	Cohoes	N. Y.
Columbus Electric & Power Company	Columbus	Ga.
Commonwealth Power, Railway & Light Co.	Danville	Ky.
Concord Gas Company	Concord	N. H.
Consolidated Gas Company of New Jersey	Long Branch	N. J.
Consolidated Gas Company of New York	New York	N. Y.
Consolidated Light & Power Company	Kewanee	Ill.
Consumers Gas & Coke Company	Waycross	Ga.
Consumers Gas Company	Reading	Pa.
Consumers Gas Company of Toronto, The	Toronto, Ont.	Canada
Consumers Power Company	Jackson	Mich.
Counties Gas & Electric Company, The	Ardmore	Pa.
Danbury & Bethel Gas & Electric Light Co., The	Danbury	Conn.
Danielson & Plainfield Gas & Electric Co.	Norwich	Conn.
Dedham & Hyde Park Gas & Electric Light Co.	Hyde Park	Mass.
Derby Gas & Electric Company, The	Derby	Conn.
Des Moines Gas Company	Des Moines	Iowa
Detroit Edison Company, The	Port Huron	Mich.
Eastern Wisconsin Electric Company	Fond du Lac	Wis.
Electric Bond & Share Company	New York	N. Y.
Elkhart Gas & Fuel Company	Elkhart	Ind.
El Paso Gas Company	El Paso	Tex.
Empire Companies, The	Bartlesville	Okla.
Empire Gas & Electric Company	Geneva	N. Y.
Emporia Gas Company	Emporia	Kans.
Fall River Gas Works Company	Fall River	Mass.
Fitchburg Gas & Electric Light Company	Fitchburg	Mass.
Florence Gas & Fuel Company	Florence	S. C.
Fort Dodge Gas & Electric Company	Fort Dodge	Iowa
Freeport Gas Company	Freeport	Ill.
Garden City Gas Company	Missoula	Mont.
Gas Light Company of Augusta, The	Augusta	Ga.
Geist Company, C. H.	Philadelphia	Pa.

Company	*City*	*State*
Georgia Railway & Power Company	Atlanta	Ga.
Gettysburg Gas Company	Gettysburg	Pa.
Grand Island Gas Co.	Grand Island	Neb.
Great Falls Gas Company	Great Falls	Mont.
Great Northern Gas Company, Ltd.	Sault Ste. Marie	Canada
Greeley Gas & Fuel Company, The	Greeley	Colo.
Greenville Gas Company	Greenville	Tex.
Greenville Natural Gas Company	Greenville	Pa.
Harrisburg Gas Company	Harrisburg	Pa.
Hartford City Gas Light Company	Hartford	Conn.
Haverhill Gas Light Company	Haverhill	Mass.
Holland Gas Works	Holland	Mich.
Huntington Light & Fuel Company, The	Huntington	Ind.
Hyde Park Gas Company, The	Scranton	Pa.
Illinois Power & Light Corporation	St. Louis	Mo.
Indiana Gas Light Company	Noblesville	Ind.
Interstate Public Service Company	Indianapolis	Ind.
Iowa City Light & Power Company	Iowa City	Iowa
Iowa Gas & Electric Company	Washington	Iowa
Iowa Railway & Light Company	Marshaltown	Iowa
Jacksonville Gas Company	Jacksonville	Fla.
Jefferson City Light Heat & Power Co.	Jefferson City	Mo.
Kings County Lighting Company	Brooklyn	N. Y.
Kingston Gas & Electric Company	Kingston	N. Y.
Knoxville Gas Company	Knoxville	Tenn.
Laclede Gas Light Company, The	St. Louis	Mo.
Laconia Gas & Electric Company	Laconia	N. H.
Lake Superior District Power Company	Ashland	Wis.
Lansing Fuel & Gas Company	Lansing	Mich.
LaPorte Gas & Electric Company	LaPorte	Ind.
Lawrence Gas Company	Lawrence	Mass.
Lebanon Gas & Fuel Company	Lebanon	Pa.
Lima Natural Gas Company, The	Lima	Ohio
Lincoln Water & Light Company	Lincoln	Ill.
Little Rock Gas & Fuel Company	Little Rock	Ark.
Lock Haven Gas Light Company	Lock Haven	Pa.
Lockport Light, Heat & Power Company	Lockport	N. Y.
Lowell Gas Light Company	Lowell	Mass.
Ludington Gas Company	Grand Rapids	Mich.
Luzerne County Gas & Electric Company	Hazelton	Pa.
Madison Gas & Electric Company	Madison	Wis.
Malden & Melrose Gas Light Company	Malden	Mass.
Malone Light & Power Company	Malone	N. Y.
Marshall Gas Light Company	Marshall	Mich.
Martinsburg Heat & Light Company	Martinsburg	W. Va.
Meridian Light & Railway Company	Meridian	Miss.
Milwaukee Gas Light Company	Milwaukee	Wis.
Minneapolis Gas Light Company	Minneapolis	Minn.
Mobile Gas Company	Mobile	Ala.
Montreal Light, Heat & Power Consolidated	Montreal, Que.	Canada
Mountain Gas Company, Inc.	Saranac Lake	N. Y.
Municipal Gas Company	Albany	N. Y.
Muscatine Lighting Company	Muscatine	Iowa
Nassau & Suffolk Lighting Company	Hempstead	N. Y.
New Brunswick Power Company	St. John, N. B.	Canada

Company	*City*	*State*
New Gas Light Company of Janesville	New Haven	Conn.
New Haven Gas Light Company	Janesville	Wis.
New Jersey Northern Gas Company	Flemington	N. J.
New Orleans Gas Light Company	New Orleans	La.
Newport News & Hampton Ry., Gas & Electric Co.	Newport News	Va.
New York & Richmond Gas Company	Stapleton	N. Y.
Northampton Gas Light Co.	Northampton	Mass.
Northern Connecticut Light & Power Company, The	Thompsonvile	Conn.
North Continent Utilities Corp.	Chicago	Ill.
North Eastern Oil & Gas Company, The	Conneaut	Ohio.
Northern Indiana Gas & Electric Company	Fort Wayne	Ind.
North Carolina Public Service Company	Greensboro	N. C.
Northern States Power Company	Faribault	Minn.
North Shore Gas Company	Waukegan	Ill.
Nova Scotia Tramways & Power Company, Ltd.	Halifax, N. S.	Canada.
Old Colony Gas Company	East Braintree	Mass.
Orlando Gas Company, The	Orlando	Fla.
Ottawa Gas Company, The	Ottawa	Canada.
Ottumwa Gas Company	Ottumwa	Iowa.
Paducah Electric Company, Inc.	Paducah	Ky.
Pawtucket Gas Company, The	Pawtucket	R. I.
Pennsylvania Power & Light Company	Allentown	Pa.
Pensacola Gas Company	Pensacola	Fla.
Peoples Gas Company	Glassboro	N. J.
Peoples Gas & Electric Company	Mason City	Iowa.
Peoples Light Company	Davenport	Iowa.
Peoples Power Company	Moline	Ill.
Petersburg Gas Company	Petersburg	Va.
Petoskey & Bay Shore Gas Company	Petoskey	Mich.
Philadelphia Suburban Gas & Electric Company	Philadelphia	Pa.
Pittsfield Coal Gas Company	Pittsfield	Mass.
Plymouth Gas Light Company	Plymouth	Mass.
Portage American Gas Co.	Portage	Wis.
Portland Gas & Coke Company	Portland	Ore.
Portland Gas Light Company	Portland	Me.
Providence Gas Company	Providence	R. I.
Public Service Company of Colorado	Denver	Colo.
Public Service Gas Company	Newark	N. J.
Rapid City Gas & Heating Company	Rapid City	S. Dak.
Red River Power Company	Grand Forks	N. D.
Republic Light, Heat & Power Company	Tonawanda	N. Y.
Roanoke Gas Light Company	Roanoke	Va.
Rochester Gas & Electric Corporation	Rochester	N. Y.
Rockford Gas Light & Coke Company	Rockford	Ill.
Rockville-Willimantic Lighting Company, The	Willimantic	Conn.
Rome Municipal Gas Company	Rome	Georgia.
Salem Gas Light Company	Salem	Mass.
San Antonio Public Service Company	San Antonio	Tex.
San Diego Cons. Gas & Elec. Company	San Diego	Calif.
Sault Ste. Marie Gas & Elec. Company	Sault Ste. Marie	Mich.
Savannah Gas Company	Savannah	Ga.
Sheridan Gas & Fuel Company, The	Sheridan	Wyo.
Sioux City Gas & Electric Company	Sioux City	Iowa.
Southern California Gas Company	Los Angeles	Calif.
Southern Gas Improvement Company	Elizabeth City	N. C.

Company	*City*	*State*
Southern Indiana Gas & Electric Company	Evansville	Ind.
Southern Minnesota Gas & Electric Company	Albert Lea	Minn.
Southern Public Utilities Company	Charlotte	N. C.
Southwestern Gas & Electric Company	Beaumont	Tex.
Spokane Gas & Fuel Company	Spokane	Wash.
Springfield Gas Light Company	Springfield	Mass.
St. Augustine Gas & Electric Light Company	St. Augustine	Fla.
St. Joseph Gas Company	St. Joseph	Mo.
St. Lawrence County Utilities, Inc.	Ogdensburg	N. Y.
St. Louis County Gas Company, The	Webster Groves	Mo.
St. Paul Gas Light Company	St. Paul	Minn.
Suffolk Gas-Electric Company	Suffolk	Va.
Syracuse Lighting Company	Syracuse	N. Y.
Tacoma Gas & Fuel Company	Tacoma	Wash.
Tampa Gas Company, The	Tampa	Fla.
Tide Water Power Company	Wilmington	N. C.
Trinidad Electric Transmission, Ry. & Gas Co., The	Trinidad	Colo.
Truckee River Power Company	Reno	Nevada.
Tucson Gas, Electric Light & Power Company, The	Tucson	Ariz.
Union Gas & Electric Company	Jackson	Mich.
United Appliance Company	Philadelphia	Pa.
United Appliance Company	Catskill	N. Y.
United Gas Improvement Company, The	Salt Lake City	Utah.
Upper Hudson Electric & Railroad Company	Bloomington	Ill.
Utah Gas & Coke Company	Springfield	Ill.
Utah Valley Gas & Coke Company	Provo	Utah.
Utica Gas & Electric Company	Utica	N. Y.
Valparaiso Lighting Company	Valparaiso	Ind.
Wabash Valley Electric Company	Martinsville	Ind.
Warsaw Gas Company	Warsaw	Ind.
Washington County Gas Company	Johnson City	Tenn.
Washington Gas Light Company	Washington	D. C.
Washtenaw Gas Company	Ann Arbor	Mich.
Wausau Gas Company	Wausau	Wis.
Westchester Lighting Company	Mt. Vernon	N. Y.
Western United Gas & Electric Company	Aurora	Ill.
Wilmington Gas Company	Wilmington	Del.
Winchester Gas & Electric Light Company	Winchester	Va.
Winnipeg Electric Railway Company	Winnipeg, Man.	Canada
Wisconsin Gas & Electric Company	Kenosha	Wis.
Wisconsin Public Service Corporation	Milwaukee	Wis.
Wisconsin Valley Electric Company	Wausau	Wis.
Worcester Gas Light Company	Worcester	Mass.
York Gas Company	York	Pa.

MANUFACTURER COMPANIES

A-B Stove Company	Battle Creek	Mich.
American Stove Company	Lorain	Ohio.
Baltimore Gas Appliance & Mfg. Co., The	Baltimore	Md.
Bastian-Morley Company	LaPorte	Ind.
Beckwith Company, The	Dowagiac	Mich.
Bryant Heater & Mfg. Company, The	Cleveland	Ohio.
Chambers Manufacturing Company	Shelbyville	Ind.
Clow & Sons, James B.	Boston	Mass.

Company	*City*	*State*
Clow & Sons, James B.	Chicago	Ill.
Clow & Sons, James B.	Philadelphia	Pa.
Comstock-Castle Stove Company	Quincy	Ill.
Detroit Stove Works	Detroit	Mich.
Eastern Service Company, The	Boston	Mass.
Estate Stove Company, The	Hamilton	Ohio
Howard Stove Company	Beaver Falls	Pa.
General Gas Light Company	New York	N. Y.
Grayson Mfg. Company, The J. H.	Athens	Ohio
Holyoke Heater Company	Holyoke	Mass.
Humphrey Company	Kalamazoo	Mich.
Iron Hydroxide Company, Inc.	Philadelphia	Pa.
Kompak Company, The	New Brunswick	N. J.
Lovekin Water Heater Company, The	Philadelphia	Pa.
Moore Bros. Company	Joliet	Ill.
Michigan Stove Co., The	Detroit	Mich.
Peerless Manufacturing Company	Louisville	Ky.
Peninsular Stove Company, The	Detroit	Mich.
Philadelphia Stove Company	Philadelphia	Pa.
Pittsburgh Water Heater Company	Pittsburgh	Pa.
Roberts & Mander Stove Company	Philadelphia	Pa.
Roberts Brass Mfg. Company, The	Detroit	Mich.
Robertshaw Thermostat Company	Youngwood	Pa.
Ruud Manufacturing Company	Pittsburgh	Pa.
Selas Company, The	Philadelphia	Pa.
Tappan Stove Company, The	Mansfield	Ohio.
Time-O-Stat Corporation	Milwaukee	Wis.
Tufts Meter Works, Nathaniel	Boston	Mass.
Welsbach Company	Boston	Mass.
West Gas Improvement Co. of America	New York	N. Y.
Wheeling Corrugating Company	Wheeling	W. Va.
Wilson Company, The H. A.	Newark	N. J.

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Societe Technique de L'Industrie du Gas en France to Celebrate Fiftieth Anniversary

The members of the American Gas Association have received an invitation to attend the meeting of the Societe Technique and participate in the exhibit and celebration of their Fiftieth Anniversary. The tentative program includes many attractive features and gives the dates of June 24 to 28, 1924.

What the A. G. A. Window Display Club is Doing

THERE WERE TWO fundamental ideas back of the plan to organize a Window Display Club of A. G. A. members. The first was to encourage the planning and installation of better gas company window displays and to generally elevate the tone and effectiveness of merchandise display work. The second was to give the individual an opportunity to originate and develop whatever ideas he or she may have had on this important element of any merchandising effort.

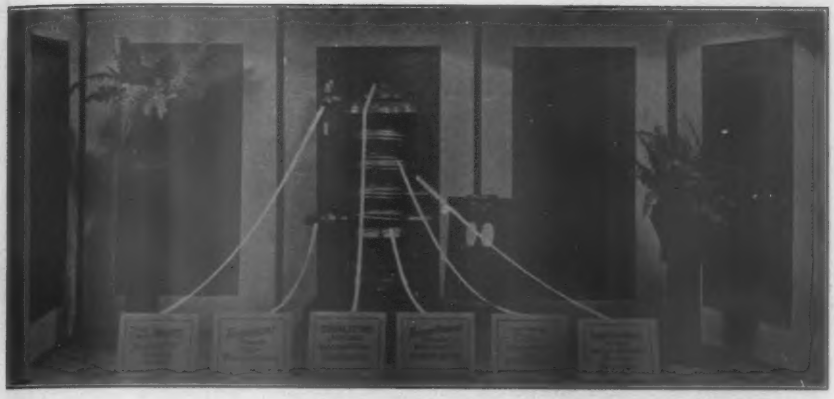
Approximately 200 members responded to the call and are now enrolled in the club, admittance to which may be had by any member without charge.

During the month of January there were a number of contributions submitted. These have been judged by the Committee of Awards who have selected the display plan submitted by J. R. Heffner, Asst. Sales Mgr. of the York Gas Co., York, Pa., to receive the first prize for January. His display is reproduced herewith.

The Committee have awarded honorable mention to the designs of the two other displays here reproduced, the first from M. D. Ogden, Advt. Dept. of the Humphrey Co., Kalamazoo, Mich., and the second from J. R. Heffner, Asst. Sales Mgr. of the York Gas Co., York, Pa.

Each month a prize of $10.00 will be awarded for the best display submitted during that month.

Prize Window for January



Honorable Mention for January

Honorable Mention for January

The Gas Sales Association of New England will meet at the City Club in Boston on Friday, March 7th. Mr. Lucius H. Bigelow will give an address on "What Constitutes a Live Gas Company from the Commercial Viewpoint."

Associations Affiliated with A. G. A.

Canadian Gas Association
Date of affiliation—Mar. 25, 1919.
Pres.—C. A. Jefferis, 265 Front St., E., Toronto, Ont., Canada.
Sec.-Tr.—G. W. Allen, 7 Astley Avenue, Toronto.
Conv., 1924.

Empire State Gas and Electric Association
Date of Affiliation—Nov. 21, 1919.
Pres.—S. J. Magee, Associated Gas & Electric Cos., Ithaca, N. Y.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.
Annual Meeting, 1924.

Illinois Gas Association
Date of Affiliation—Mar. 19, 1919.
Pres.—Robert B. MacDonald, Peoples Power Co., Moline, Ill.
Sec.-Tr.—R. V. Prather, 305 Illinois Mine Workers Bldg., Springfield, Ill.
Conv., Hotel Sherman, Chicago, Ill., March 26, 27.

Indiana Gas Association
Date of Affiliation—April 24, 1919.
Pres.—L. Fitzgerald, Gary Heat, Light & Water Co., Gary, Ind.
Sec.-Tr.—E. J. Burke, Citizens Gas Co., Indianapolis, Ind.
Conv., West Baden Springs Hotel, West Baden, May 5, 6, 1924.

Iowa District Gas Association
Date of Affiliation—May 21, 1919.
Pres.—Charles Smith, Yankton Light & Heating Co., Yankton, S. D.
Sec.-Tr.—H. R. Sterrett, 551 Seventh St., Des Moines, Ia.
Conv., Sioux City, Ia., April 16, 17, 18, 1924.

Michigan Gas Association
Date of Affiliation—Sept. 18, 1919.
Pres.—Geo. H. Waring, American Public Utilities Co., Grand Rapids, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.
Conv., Detroit, Mich., Sept. 9, 10, 11, 1924.

Missouri Association of Public Utilities
Date of Affiliation—June 18, 1920.
Pres.—H. C. Blackwell, 1330 Grand Ave., Kansas City, Mo.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
Wiley F. Corl, Chmn., Affiliation Com., Missouri Utilities Co., Mexico, Mo.
Conv., 1924.

New England Association of Gas Engineers
Date of Affiliation—Feb. 19, 1919.
Pres.—C. E. Paige, C. H. Tenney & Co., Boston, Mass.
Sec.-Tr.—J. L. Tudbury, 247 Essex St., Salem, Mass.
Conv., 1925.

Gas Sales Association of New England
Date of Affiliation—Oct. 1, 1919.
Gov.—F. A. Woodhead, 689 Massachusetts Ave., Arlington, Mass.
Sec.—J. H. Sumner, 719 Massachusetts Ave., Cambridge, Mass.
Annual Meeting, 1924.

New Jersey Gas Association
Date of Affiliation—April 25, 1919.
Pres.—James P. Hanlan, Public Service Gas Co., Newark, N. J.
Sec.-Tr.—R. A. Koehler, Public Service Gas Co., Newark, N. J.
Conv., Bellevue-Stratford Hotel, Philadelphia, April 9-10, 1924.

Pacific Coast Gas Association
Date of Affiliation—Sept. 18, 1919.
Pres.—H. R. Basford, H. R. Basford Co., San Francisco, Cal.
Sec.-Tr.—W. M. Henderson, 812 Howard St., San Francisco, Cal.
Conv., Santa Barbara, Cal., Sept., 1924.

Pennsylvania Gas Association
Date of Affiliation—April 10, 1919.
Pres.—Grier Hersh, York Gas Co., York, Pa.
Sec.-Tr.—Geo. L. Cullen, Harrisburg Gas Co., Harrisburg, Pa.
Conv., Bellevue-Stratford Hotel, Philadelphia, April 9-10, 1924.

Southern Gas Association
Date of Affiliation—May 20, 1919.
Pres.—E. L. Rieha, 1602 Lexington Bldg., Baltimore, Md.
Sec.-Tr.—E. D. Brewer, 75 North Mayson Ave., Atlanta, Ga.
Conv., Bon-Air Vanderbilt Hotel, Augusta, Ga., April 22-24, 1924.

Southwestern Public Service Association
Date of Affiliation—September 26, 1923.
Pres.—J. H. Gill, Dallas, Texas.
Sec.—E. N. Willis, 403 Slaughter Bldg., Dallas, Texas.
Conv., New Orleans, La., April 22, 23, 24, 25, 1924.

Wisconsin Utilities Association
Date of Affiliation—March 25, 1919.
Pres.—Harold L. Geisse, Wisconsin Valley Electric Co., Wausau, Wis.
Exec.-Sec.—J. N. Cadby, 445 Washington Bldg., Madison, Wis.
Conv., Hotel Pfister, Milwaukee, Wis., April 17-18, 1924.

Geographic Divisions

Eastern States Gas Conference
Date of Formation—April 11, 1923.
Pres.—P. H. Gadsden, The United Gas Improvement Co., Philadelphia, Pa.
Sec.-Tr.—L. R. Dutton, Philadelphia Suburban Co., Jenkintown, Pa.
Conv., Bellevue-Stratford Hotel, Philadelphia, April 9-10, 1924.

Operation of Ammonia Concentrators in Small Gas Plants

J. R. WOHRLEY, Gas Efficiency Engineer, Cities Service Co., New York, N. Y.

One of the most persistent problems that the small plant operator has to solve is the profitable disposition of ammonia. Mr. Wohrley has presented a splendid analytical survey of the economic factors governing the installation and operation of the necessary equipment, which should be of tangible assistance to those facing this problem. If you would be interested in seeing this paper amplified and presented for discussion at the convention, send in your comments to the Secretary of the Section at Headquarters. The problem, we believe, is of sufficient importance to the smaller company to warrant such action. (EDITOR'S NOTE.)

THE QUESTION often arises, in connection with comparatively small gas plants, whether or not it may be profitable to attempt to recover and concentrate the ammonia. Before deciding to install the necessary equipment for the recovery and concentration of ammonia to be sold in the form of crude concentrated gas liquor, an analysis of all of the various items of cost should be made as accurately as possible. This will serve to show the total cost per pound of ammonia recovered. At the same time an investigation should be made to determine the market conditions of the product for sale and to determine how much per pound can be expected from the sale of the concentrated liquor after deducting the charges for freight. A comparison of these figures will make it possible to decide the above question and to determine what may be expected in the way of net earnings from this operation.

The following curve sheet No. 1 is

given in an attempt to show how the above discussion can be made to apply. It is not intended that this analysis should apply to all cases. A similar analysis can readily be made for any case or the curves given may be altered to suit any local conditions. These calculations were based upon a recovery of 5 lbs. total ammonia per ton of coal. It was also assumed that the weak liquor contained from 1 to 1½ per cent ammonia and that 20 per cent of the ammonia was in the fixed state. It will be observed from the curves that when the net selling price per pound of ammonia is $0.07, a plant carbonizing 22 tons coal per day can just break even on the operation of a concentrator. When it is possible to secure a net selling price of $0.06 per pound of ammonia a plant carbonizing only 28 tons of coal per day will just break even on the operation. It may also be observed that the curve representing "total cost per pound ammonia" falls quite rapidly up to a plant carbonizing 100 tons of coal per 24 hours at which point the rate of decline is not so rapid. A plant of this size could normally expect to secure a net profit of approximately $0.036 per pound of ammonia sold. This of course, may be more or less, depending upon the net selling price, local operating conditions and to some extent upon the type of concentrator used.

It appears that the overhead expense represents the greatest cost and becomes prohibitive for the very small plant. Eliminating the overhead expense even a plant of 10 tons of coal per day could operate at a slight profit. The costs as shown by the curves would of course be altered in cases where more or less than 5 lbs. of ammonia per ton of coal are recovered, being less in the former case and greater in the latter. The following table will show the size of concentrator assumed for various plant capacities.

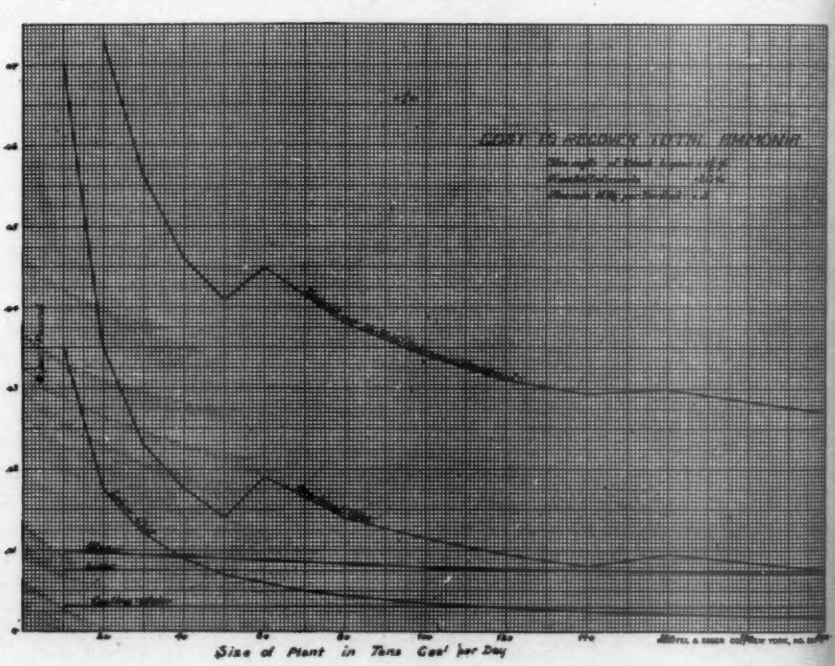


TABLE I

Size of Plant Tons Per Day	Pounds Ammonia Produced Per Day	Gal. of Weak Liquor Per Day*	Gal. of Weak Liquor Per Min.	Size of Concen. Inches
10	50	398	.28	24
20	100	796	.56	24
30	150	1194	.84	24
40	200	1592	1.12	24
50	250	1990	1.40	24
60	300	2388	1.68	36
70	350	2786	1.96	36
80	400	3184	2.24	36
90	450	3582	2.52	36
100	500	3980	2.80	36
120	600	4776	3.36	36
140	700	5572	3.92	36
160	800	6368	4.48	48
180	900	7164	5.04	48
200	1000	7960	5.60	48

*Based upon a recovery of 5 lbs. ammonia per ton of coal carbonized from a weak liquor of 1½% total ammonia at a specific gravity of 8.4 lbs. per gal.

The approximate investment and overhead expense for each size of concentrator is given in the following estimate:

TABLE II

Item	Size of Concentrator 24"	36"	48"
A. Cost of Concentrator installed, including auxiliaries	$4,000	$7,000	$10,000
B. Cost of remodeling scrubbing system to recover ammonia	1,000	2,000	2,500
C. Cost storage tanks including foundations, piping, covers, etc.	1,500	2,000	2,000
D. Cost concentrator foundations and suitable buildings	1,200	1,800	2,000
E. Miscellaneous	800	1,200	1,600
F. Total Investment	8,500	14,000	18,100
G. Carrying charges at 10 per cent year	850	1,400	1,810
H. Overhead operations:			
a. Maintenance at 2 per cent year	170	280	362
b. Replacement at 3 per cent year	255	420	543
c. Total	425	700	905
I. Total Overhead per year	1,275	2,100	2,715
J. Total Overhead per day	3.50	5.75	7.50

It will be noted in the above classification of costs that an allowance has been made for remodeling the scrubbing system. It is believed that this cost should logically be charged to ammonia recovery since in plants not recovering the ammonia certain refinements in scrubbing operations are not essential as in the case where the weak liquor is properly collected for concentration.

Regarding the labor cost involved in connection with the recovery and concentration of ammonia, it is not necessary that the time of one man be devoted entirely to this operation. A properly designed concentrator, properly adjusted throughout and provided with thermostatic control, will continue to operate very satisfactorily with very little attendance. Such adjustments as may be necessary should be made by the foreman or someone who is entirely familiar with the operation. The apparatus will need to be given a thorough cleaning periodically, say once per month. This will require the services of two men for about a day. There will also be a certain amount of miscellaneous labor required from time to time, such as adjusting and repairing pumps, stopping steam and liquor leaks, etc. In general normal operation the amount of labor required

will not be increased with an increase in the size of the plant. The supervision of a large plant will require no more time than that for a small one. The labor cost per pound of ammonia recovered, should therefore become less with increasing size of plant. The curve representing labor cost is based upon the following:

TABLE III

A. Labor cleaning Concentrator once per month, 2 men—one day—per month	$ 8.00
B. Foreman's time chargeable to supervision of concentrator and scrubbing system, etc., per month	30.00
C. Miscellaneous labor—per month	15.00
Total per month	$53.00

The cost of steam represents a considerable portion of the total cost per pound. Considerably more steam will be required to concentrate a weak liquor of 1 per cent ammonia than one containing, say, 2 per cent; hence the desirability of producing the proper grade of weak liquor for concentration. The heat lost due to direct radiation from different sizes and types of concentrators would have a slight effect upon the quantity of steam required. This, however, represents a comparatively small portion of the total steam used. For the curve representing the cost of steam a total consumption of 20 pounds per pound of ammonia was used. This is based upon a weak liquor of 1½ per cent ammonia, 20 per cent of which is fixed. When the heat from the waste liquor is utilized for preheating the weak liquor the steam consumption may be reduced depending upon the amount of preheating. The cost of producing steam in a small plant was considered to be greater than in one of larger size when perhaps the type of boiler and methods of operation would tend toward greater economy. The following costs for steam were used:

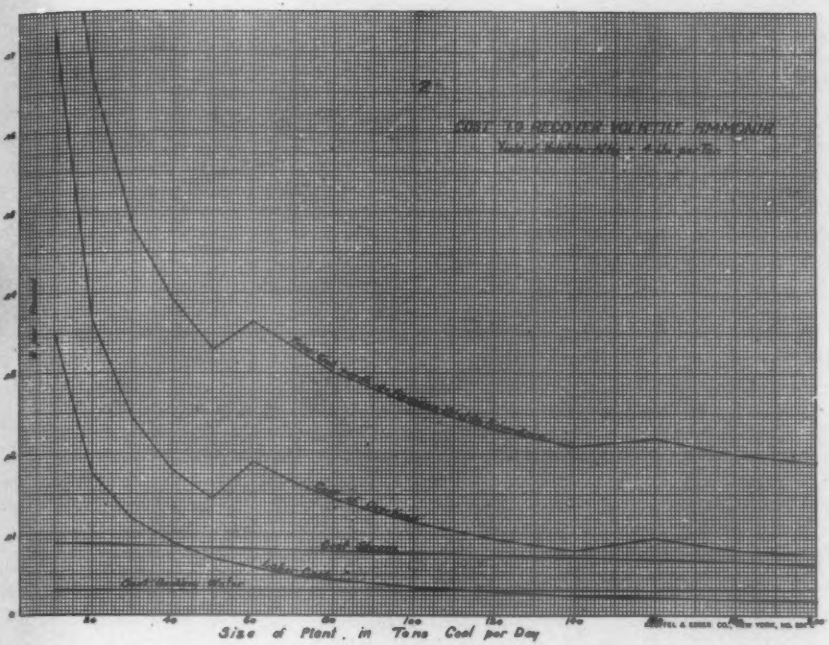
STEAM COST—TABLE IV

Size of Plant Tons Coal/Day	Pounds Steam Per Lb. Ammonia	Cost Steam Per M. Lbs.	Cost Steam Per Lb. Ammonia
10	20	$.50	.010
50	20	.45	.009
100	20	.40	.008
150	20	.38	.0076
200	20	.36	.0072

Whether or not cooling water should be charged for would of course depend upon local conditions and the source of supply, also to what use the water was put after being used for cooling purposes. With a properly designed condenser about 9 gallons cooling water will be required per pound of ammonia, not taking into account the cooling due to radiation and evaporation. Assuming an industrial rate of $0.35 per M gal. for water the cost per pound of ammonia would amount to $0.0032.

Assuming that 20 per cent of the ammonia in the weak liquor is in the fixed state, for every five pounds of total ammonia recovered one pound will be fixed, which will require around 2½ pounds of burned lime; hence, to concentrate 5 pounds of ammonia 20 per cent being fixed and with lime costing $0.015 per pound delivered the cost per pound total ammonia will be $0.0075. The cost of lime will, of course, vary widely throughout the country so that this cost would need to be taken into account locally.

The foregoing discussion has been based upon the recovery of all of the ammonia in the liquor, both volatile and fixed. In curve sheet No. 2 it is attempted to show the cost per pound to recover free ammonia only for the var-



ious sized plants. In this case the total overhead charges per day will be somewhat reduced due to a reduction in the investment in the concentrating equipment. This reduction amounts to about 25 per cent. The cost of lime has been eliminated and daily cost of labor reduced approximately 9 per cent while a 20 per cent reduction was made in the amount of water required. Table V will show the investment estimated to recover the volatile ammonia only:

TABLE V

	Size of Concentrator		
	24"	36"	48"
A. Cost Concentrator Installed	$3,000	$5,250	$7,500
B. Remodeling Scrubbing System	1,000	2,000	2,000
C. Cost Tanks	1,500	1,500	2,000
D. Foundations and Buildings	1,000	1,500	1,800
E. Miscellaneous	600	900	1,200
F. Total Investment	$7,100	$11,150	$14,500
G. Carrying Charges at 10 per cent year	710	1,115	1,450
H. Overhead Operation:			
a. Maint. at 2 per cent year	142	223	290
b. Replacement at 3 per cent year	213	334	435
c. Total	355	557	725
I. Total Overhead Exp.	1,065	1,672	2,175
J. Total Overhead per day	2.92	4.58	5.98

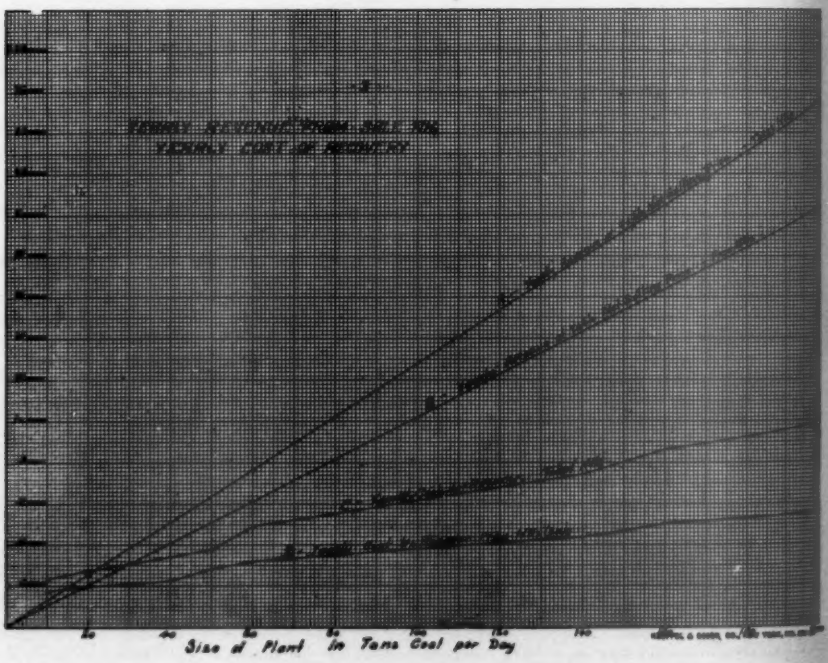
TABLE VI

Size of Plant	Pounds Ammonia Produced Per Day*	Gal. of Weak Liquor Per Day	Gal. of Weak Liquor Per Min.	Size of Concen. Inches
10	40	398	.28	24
20	80	796	.56	24
30	120	1194	.84	24
40	160	1592	1.12	24
50	200	1990	1.40	24
60	240	2388	1.68	36
70	280	2786	1.96	36
80	320	3184	2.24	36
90	360	3582	2.52	36
100	400	3980	2.80	36
120	480	4776	3.36	36
140	560	5572	3.92	36
160	640	6368	4.48	48
180	720	7164	5.04	48
200	800	7960	5.60	48

*Based upon the recovery of the volatile ammonia only.

In the foregoing Table VI is given the production of volatile ammonia, amount of liquor and size of concentrator for the various sized plants. The same sized concentrator was taken as in Table I, although as in Table VI the concentrators would have somewhat greater capacities than shown. This, however, was not taken into consideration in the calculations.

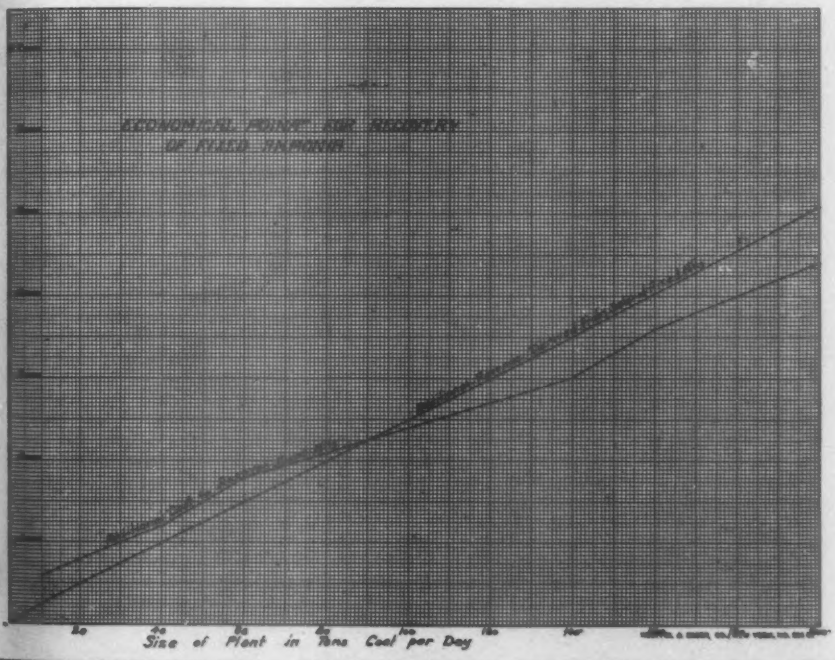
From the results of curve sheets Nos. 1 and 2, curve sheet No. 3 is given showing the yearly costs in dollars of recovering total ammonia and the same for free ammonia. Also is given the gross revenue per year to be derived from the



sale of total ammonia at 7 cents net per pound and the same for free ammonia. For any size plant the value given for curve A minus that for curve B gives the additional revenue to be derived from the recovery of fixed ammonia. Likewise for the same size plant curve C minus curve D represents the additional cost in dollars per year to provide for this increase in revenue.

Those differences were plotted on curve sheet No. 4 where it will be observed that for plants carbonizing less than 90 tons of coal per day it is unprofitable to attempt to recover the fixed ammonia. As previously stated this will not necessarily fit all cases, but can be readily worked out for any individual case somewhat along these lines and the correct analysis arrived at.

In summarizing the above calculations, assuming that the net selling price of ammonia per pound is 7 cents, it is not profitable for plants of 19 tons of coal per day or less to recover even the volatile ammonia. The recovery of the fixed ammonia should not be attempted in plants carbonizing less than 90 tons of coal per day.



Employment Bureau

SERVICES REQUIRED

Wanted by a gas and electric company, young man to do office work who has had experience in ledger work, general routine work, and especially on the complaint or service desk. In reply, please give outline of experience, references and salary expected. Address:
Key No. 022.

WATER HEATER SALESMEN WANTED—A large gas company needs several good water heater salesmen to work on commission basis in Western Pennsylvania. Exceptionally good territory.
Key No. 026.

WANTED—Foreman for main laying gang. Must be experienced in laying 4" to 12" cast iron main and able to handle main repair work on low and medium pressure lines. Location, New Jersey Coast. State age, experience and wages expected. Address A. G. A.
Key No. 031.

MIDDLE WEST GAS COMPANY, opening Industrial Gas Dept., desires at least two high grade industrial men. City has diversified list of industrials requiring men of varied experience. Address A. G. A.
Key No. 033.

WANTED—Company operating several gas properties in Middle West can use three experienced industrial gas men. Address A. G. A.
Key No. 037.

WANTED—Young man with practical experience in gas distribution for the position of Assistant Superintendent of Gas Distribution in a rapidly growing southern city. Gas output more than a billion cubic feet per year. Give education, experience and salary expected in first letter. Address A. G. A.
Key No. 038.

WANTED—Two experienced salesmen, to specialize on the sale of gas boilers for house heating and industrial uses, by a gas company desirous of increasing its present gas boiler load. Give details of experience and results obtained.—Address A. G. A.
Key No. 039.

DIRECTOR OF STORES DEPARTMENTS WANTED.—Must be familiar with best practice in handling Materials & Supplies, and be capable of directing other employees. Company is a combined Gas, Electric Light and Power, and Electric Railway Company, operating in a number of cities in the middle west. In application give age, education, experience, salary expected, etc. Application will be treated as strictly confidential, and handled only by an official. To enable us to form some idea of ability and mental capacity include in application your idea of how Stores Departments of such a Company, operating over considerable territory, should be handled, and what Director's duties and responsibilities should be. Address A. G. A.
Key No. 040.

WANTED—Industrial Gas Appliance Salesman. Hudson Valley territory having 6,500 gas consumers. Technical as well as practical experience necessary. Either a straight salary or commission basis. A good opportunity for the person qualified for such a position. Address A. G. A.
Key No. 041.

SERVICES OFFERED

POSITION WANTED—By-Product, Coke-Oven Executive seeks more responsible connection. Fitted for Chief Chemical Engineer. Assistant-Superintendent or Assistant to Manager. University Graduate. Alexander Hamilton Institute Graduate. Nearly seven years with present 3000 ton plant. Thirty-two years old. Married. Address A. G. A.
Key No. 151.

WANTED—Position of responsibility as Manager or Industrial Fuel Engineer—18 years' varied experience in the gas business. References and service record furnished. Address A. G. A.
Key No. 142.

ENG.-SUPT. of one of the largest gas plants in the country would consider change. Desires to locate with company in which opportunities for future advancement are better than in present position. Is a married man. Has technical University training. No particular preference as to location. Address A. G. A.
Key No. 159.

WANTED—Position as manager of small gas plant (about 10,000 meters) or sales manager of large plant. Can furnish the very best reference.
Key No. 158.

WANTED—Am open for position as general superintendent, engineer or manager of fair sized property. Fifteen years' experience in combination coal and water gas plants. Experience covers vertical and horizontal coal gas installations, also distribution work. At present am managing plant of five million sendout and have been working in capacity of assistant engineer. Can furnish excellent credentials from present and past employers. Married. Can report with reasonable notice. Address A. G. A. Monthly.
Key No. 164.

AVAILABLE—Man of executive ability, experienced in all phases of the gas business and sales and advertising work including agency work on National accounts. Capable of creating, planning and following through all forms of advertising. Prefer locating in West or South Atlantic states. Minimum salary of $4,000. Address A. G. A.
Key No. 167.

WANTED—Superintendent of Distribution or similar position high or low pressure. 14 years' experience covering all branches of the work, office, field, and shops. Speaks and writes Spanish. Southern part of U. S. or Latin America preferred but not essential. Address A. G. A.
Key No. 169.

AM OPEN FOR A POSITION of greater responsibility. At present, manager of gas company with over 5,000 meters. Technical training started in as cadet engineer with one of large operating companies in U. S. Have eleven years experience in engineering, construction, distribution and manufacturing, and over four years in commercial, new business and financial as manager. Prefer manager's position in good sized city. Age 40 years and married. Address A. G. A.
Key No. 170.

GAS ENGINEER—Eighteen years' experience in design, construction and operation of gas plants, all departments, manufacture and distribution, also electrical experience in combination plants, desires position of responsibility with progressive company. Past six years chief engineer with large gas company. Address A. G. A.
Key No. 171.

EXECUTIVE, with fifteen years' experience in coke oven practice on plants manufacturing surplus gas for city consumption, desires connection with growing public utility either as executive or position leading to same. College graduate, good personality, married. Available on reasonable notice. Address A. G. A.
Key No. 172.

GAS ENGINEER—18 years' experience with 3 largest gas companies in the country, am open to engagement as gas engineer, general superintendent, manager or sales engineer. Excellent references. Address A. G. A.
Key No. 173.

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F. C. Weber ..... New York, N. Y.
Geo. Williams ..... New York, N. Y.

AMERICAN GAS ASSOCIATION, INC.

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H. S. RESIDE	Washington, D. C.

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Vice-Chairman	H. C. DAVIDSON	New York, N. Y.
Secretary	H. W. HARTMAN	Ass'n Headqtrs.
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Secretary	C. W. PERSON	Ass'n Headqtrs.
COMMERCIAL—Chairman	J. E. DAVIES	Chicago, Ill.
Vice-Chairman	J. P. HANLAN	Newark, N. J.
Secretary	LOUIS STOTZ	Ass'n Headqtrs.
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Vice-Chairman	GEO. H. WARING	Grand Rapids, Mich.
Secretary	H. W. HARTMAN	Ass'n Headqtrs.

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ASS'T SECRETARY-MANAGER	LOUIS STOTZ	Ass'n Headqtrs.
ASS'T SECRETARY-MANAGER	N. T. SELLMAN	Ass'n Headqtrs.